

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2524.—VOL. LIV.

LONDON, SATURDAY, JANUARY 5, 1884.

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FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC
—Highest Award for Effectiveness in Boring, and Economy in
the Consumption of Air

JUBILEE EXHIBITION, 1882.
THE PATENT

"GORNISH" ROCK DRILL.

FIRST
SILVER
MEDAL,
MINING
INSTITUTE
OF
CORNWALL.

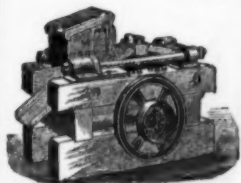


FIRST
AWARD,
BORING
CONTEST
DOLCOATH
MINE,
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1881.

Prices and particulars on application to the Manufacturers
HOLMAN BROTHERS,
CAMBORNE FOUNDRY AND ENGINE WORKS,
CAMBORNE, CORNWALL.

ENGINES, AIR COMPRESSORS, TUNNELLING
CARRIAGES, TRIPODS, &c.,
From own design, or to order.

BLAKE'S LATEST IMPROVED PATENT
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ALL STRAINS TAKEN BY
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DOES TWICE THE WORK OF
OLD FORM.
SECTIONAL AND EASILY
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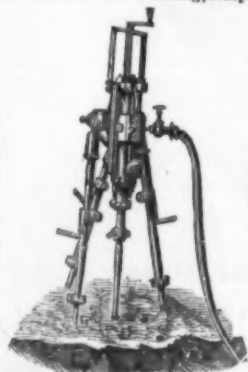
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"RELiance" AND
AIR-COMPRESSOR."

First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

SILVER MEDAL—PARIS, 1878—
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Are NOW SUPPLIED to the
ENGLISH, FOREIGN, and
COLONIAL GOVERN-
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1875—Leeds.
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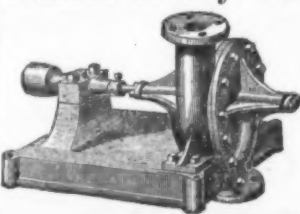


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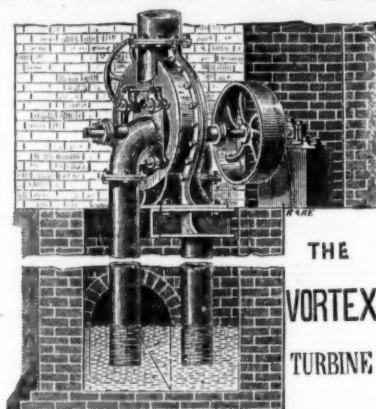


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PEARN'S combination of the SLIDE VALVE and PORTS in the AUXILIARY CYLINDER is the Simplest and most PERFECT CUSHION

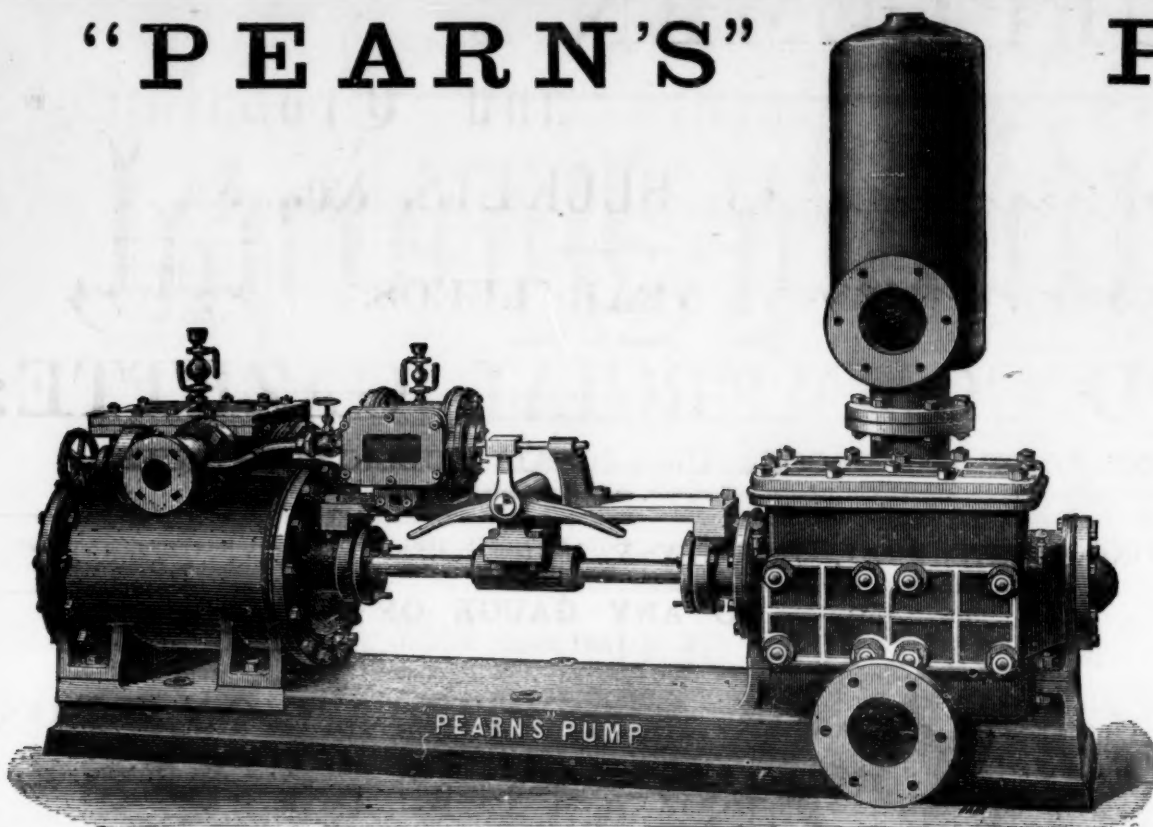
SIMPLICITY

AND

DURABILITY.

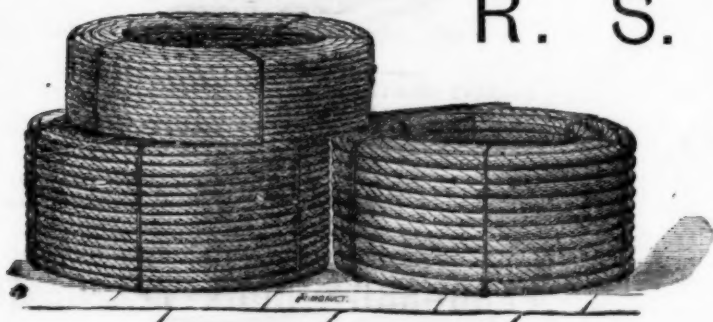
IT HAS NO INTRICATE PARTS, the WORKING PARTS are the same as used in the ordinary STEAM ENGINE.

It is as Simple and as DURABLE as any Fly-wheel Pump, and cannot possibly become DERANGED.



DIAMETER OF WATER CYLINDER..... In.	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14
DIAMETER OF STEAM CYLINDER.....	4 in.	5 in.	6 in.	6 in.	7 in.	7 in.	8 in.	10 in.	12 in.	12 in.	14 in.	14 in.	16 in.	18 in.
Length of Stroke	9 in.	9 in.	9 in.	9 in.	12 in.	12 in.	12 in.	12 in.	12 in.	18 in.	24 in.	24 in.	24 in.	24 in.
Content, Gallons per Hour	650	1500	2180	2940	3840	4860	6000	8640	11590	15360	19440	24000	34650	46360
Price..... £	18	22	24	28	35	38	45	60	70	85	130	140	180	230

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PATENT STEEL FLEXIBLE ROPES AND HAWSERS.

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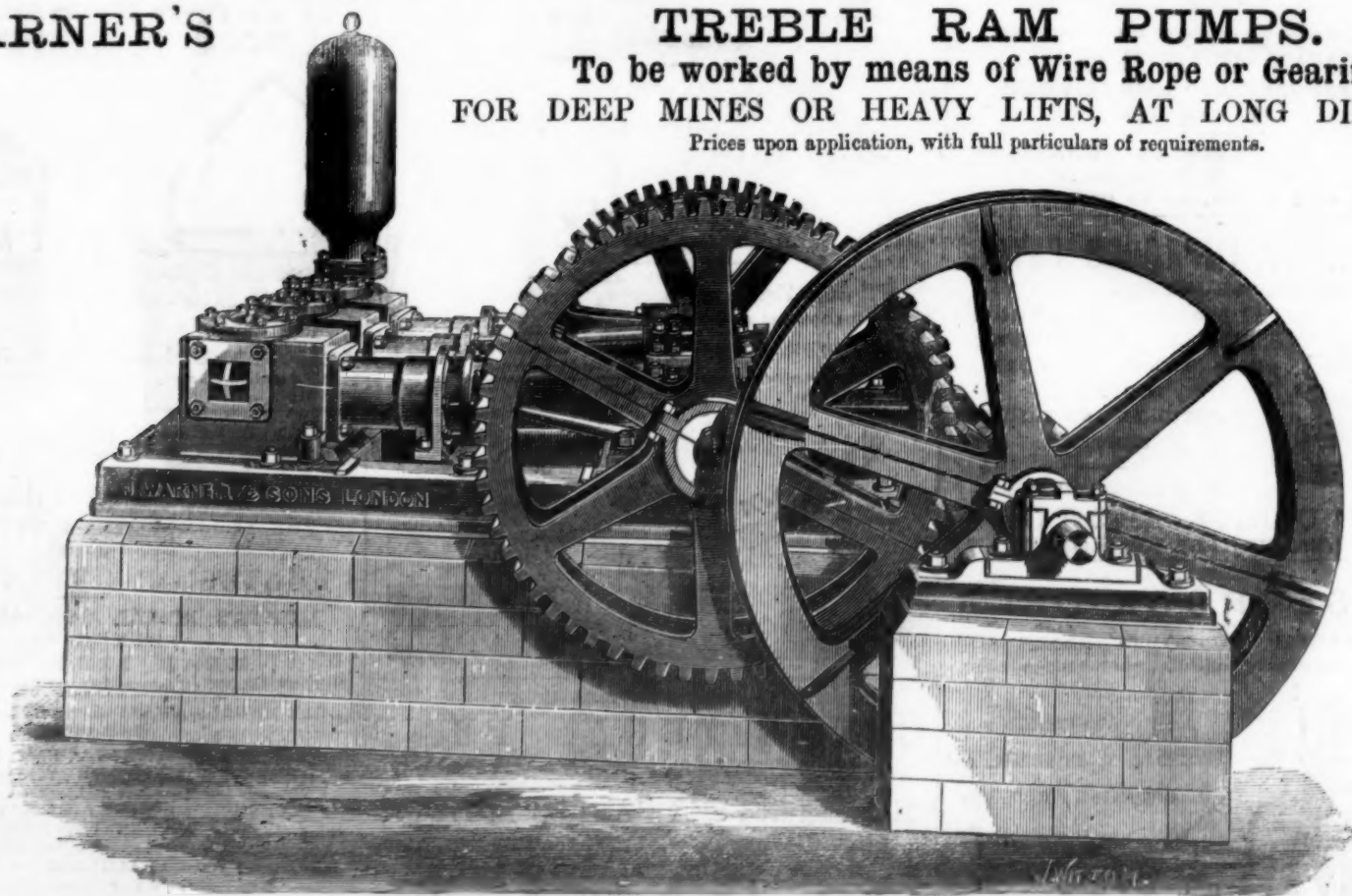
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To be worked by means of Wire Rope or Gearing.

FOR DEEP MINES OR HEAVY LIFTS, AT LONG DISTANCES.

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Patent Steel Trucks, Points and Crossings, PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

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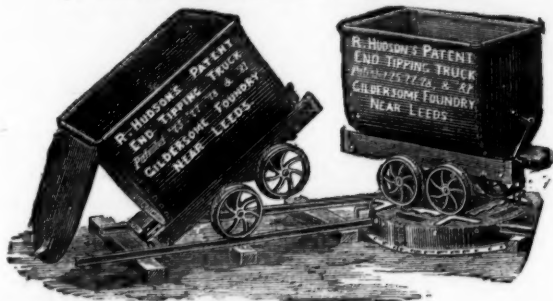
UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the **LIGHTEST, STRONGEST**, and most **CAPACIOUS** made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.

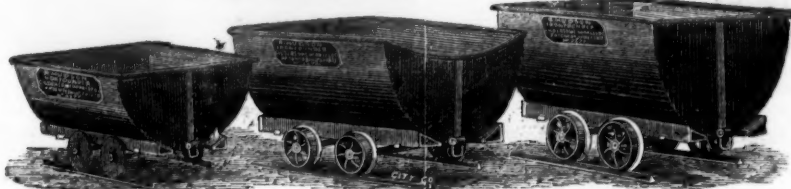
N.B.—The American, Australian, Indian, and Spanish Patents on Sale.

CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

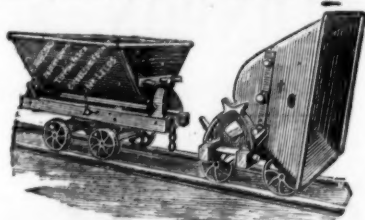
1.—PATENT STEEL END TIP WAGONS.



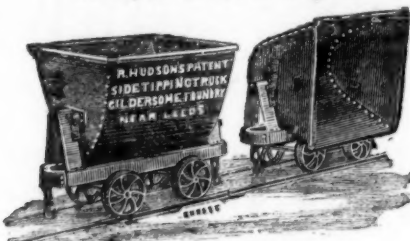
7.—PATENT STEEL MINING WAGONS.



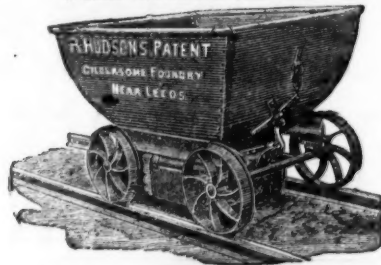
2. PATENT UNIVERSAL TRIPLE-CENTRE
STEEL TIPPING TRUCK,
Will tip either side or either end of rails.



8.—PATENT DOUBLE-CENTRE STEEL
SIDE TIP WAGONS,
Will tip either side of Wagons.

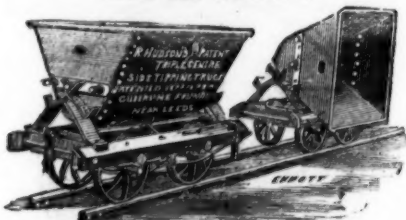


12.—PATENT STEEL HOPPER WAGON,
WITH BOTTOM DOORS.

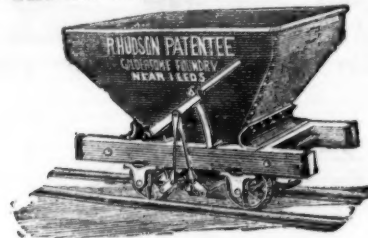


ONE MAN CAN EASILY TIP ANY WEIGHT IN THESE WAGONS.

3.—PATENT TRIPLE-CENTRE STEEL
SIDE TIP WAGONS.



13.—PATENT STEEL HOPPER WAGON.



4.—PATENT STEEL PLATFORM OR
SUGAR CANE WAGON.



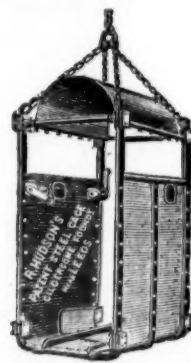
9.—PATENT STEEL ALL-ROUND TIP
WAGON.



14.—SELF-RIGHTING STEEL
TIP BUCKET.
(The "CATCH" can also be made SELF-
ACTING if desired.)



15.—STEEL CAGE.



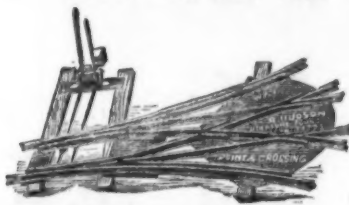
5.—PATENT STEEL CASK.
As supplied to H.M. War Office for the late war in Egypt.
DOUBLE THE STRENGTH OF ordinary Casks without any
INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)



10.—LEFT-HAND STEEL POINT AND
CROSSING.

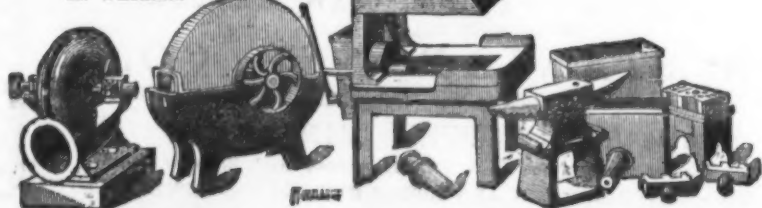


11.—RIGHT AND LEFT-HAND STEEL
POINT AND CROSSING.



6.—ROBERT HUDSON'S
PATENT IMPROVED IRON
SMITH'S HEARTH.
NO BRICKWORK REQUIRED.

A Special quality made almost entirely
in STEEL, effecting a GREAT SAVING
IN WEIGHT.



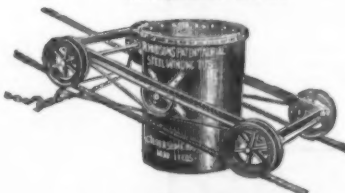
Large numbers in use by all the principal Engineers in this
country and abroad.

16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.



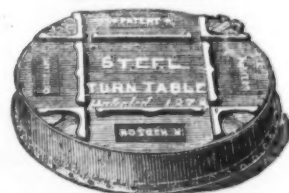
A great success.

18.—"AERIAL" STEEL
WINDING TUB.



Largely employed in the South African
Diamond Fields.

17.—STEEL SELF-CONTAINED
TURN TABLE.



(Also made in Cast Iron for use where
weight is not a consideration.)

No. 19.—PATENT STEEL CHARGING BARROW,
DOUBLE the STRENGTH & much LIGHTER than ordinary Barrows.



ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES

BELL'S ASBESTOS.

BELL'S PATENT ASBESTOS BLOCK PACKING, for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes.

It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in its selection and manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. So successfully has this been done, that with light screwing, it has been found in practice that little or no lubricant is required to ensure a minimum amount of friction, and to keep the rods from over-heating. An improved vacuum is always maintained by the use of this packing, which meets with unqualified approval wherever it is applied.

The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid.

An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 28½ in."

As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

BELL'S ASBESTOS YARN AND SOAPSTONE PACKING for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—

Mr. John Bell, 118, Southwark-street, S.E.
 DEAR SIR,—I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.
 Yours truly,
 (Signed) W. WILLIAMS.

Every 10 ft. length of Bell's Asbestos Yarn and Soapstone Packing bears a special label with the Trade Mark, and engineers are earnestly requested to see that this label is attached, to prevent imposition by worthless imitations.



To avoid spurious imitations, and to secure the receipt of genuine goods, all orders should be sent direct to the under-mentioned addresses, and not through Agents or Factors.

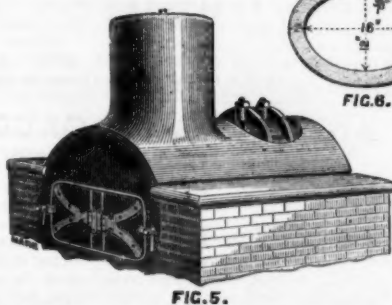


FIG. 5.



FIG. 6.



FIG. 1.

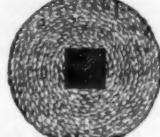


FIG. 2.



FIG. 4.



FIG. 3.

BELL'S ASBESTOS BOILER & PIPE COVERING COMPOSITION, for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
 " " " Covering - - - 94 deg.

1 ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon,
 DEAR SIR,— Nov. 28th, 1883.
 It may interest you to know that we have exactly 40 per cent. in fuel through using your covering.
 Yours truly,
 W. SANTO CRIMP, C.E., F.O.S.

BELL'S ASBESTOS AND INDIA-RUBBER WOVEN TAPE AND SHEETING, for making every class of Steam and Water Joints. It is the most efficient material for making bilge water pipe joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ¼ in. (Fig. 6) to 3 in. wide, and any thickness from 1/8 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary.

The same material is made up into sheets about 40 in. square, and each sheet bears my Trade Mark, without which none is genuine.

Mr. John Bell, 118, Southwark Street, S.E.
 DEAR SIR,—I have much pleasure in informing you that I have used your Asbestos and India-rubber Woven Sheeting and Tape with great satisfaction. Some of the Tape has been in use nearly 12 months on the pump cover joints, and situated as I am where there is no storage for the sewage, always obliged to keep one engine running, the facility and great saving of time in taking up a cover jointed with your Tape is a very important consideration.—Yours truly,
 J. ASHCROFT, Chief Engineer.

It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with articles of less value at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears my Trade Mark.

BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ¼ millimetre to 25 millimetres thick. Each sheet bears my Trade Mark.

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

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OR THE BRANCH WAREHOUSES—

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21, RITTER STRASSE, BERLIN.

T. LARMUTH & CO.,

ENGINEERS,
 MANCHESTER, ENGLAND.

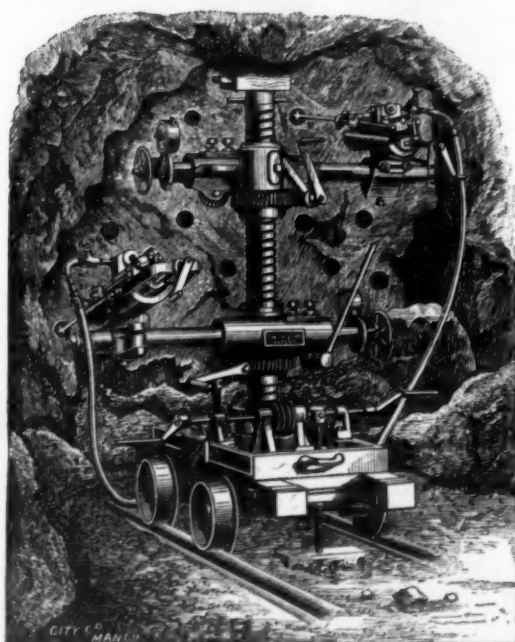


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PATENT ROCK DRILL CARRIAGE

STEAM CRANES, OVERHEAD TRAVELLERS,
 ENDLESS CHAIN ELEVATORS, AND FEED SHEETS,
 TRAVERSERS AND TURNTABLES,
 Engineers' Tools of every description.
 LLOYD'S FANS,
 MINE VENTILATING FANS,
 CENTRIFUGAL PUMPS.

SHAFTING, GEARING, AND PULLEYS.

Sole Makers of J. Priestman and Son's Patent Leather Striking Machines.



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WINDING AND PUMPING ENGINES,
 IMPROVED CONDENSING AND NON-CONDENSING HIGH-PRESSURE
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SPECIALITIES FOR
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FROISETH'S NEW AND REVISED MAP FOR 1875.
 Size 40 by 56 inches, scale 5 miles to the inch. Handsomely engraved, colored in counties, showing the Towns, Settlements, Rivers, Lakes, Railroad, Mining Districts, &c., throughout the Territory, and all the Government Surveys to date. Mounted on cloth, £2; half-mounted, £1 12s.; pocket form, £1.
 Also, GENERAL MINING MAP OF UTAH, showing twenty-eight of the principal Mining Districts adjacent to Salt Lake City, and location of the most prominent mines. Price, pocket form, 6s.
 Also, NEW MAP OF LITTLE AND BIG COTTONWOOD MINING DISTRICTS, showing the location of over Four Hundred Mines and Tunnel Sites, together with the Mines Surveyed for United States Patent. Price, sheets, 4s.; pocket form, 8s.
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 PURCHASES and SALES of MINING PROPERTY effected, with careful regard to the interests of clients.

MANCHESTER WIRE WORKS.

NEAR VICTORIA STATION, MANCHESTER.

(ESTABLISHED 1790).

JOHN STANIAR AND CO.,

Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for
LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper.
 EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

PERFORATED IRON, STEEL, COPPER, AND ZINC PLATES IN VARIOUS DIMENSIONS AND THICKNESSES.
 Shipping Orders Executed with the Greatest Dispatch

THE METAL TRADE—ANNUAL REVIEW.

REMARKS.—In the state of the Metal Trade of 1883 there has been nothing of a striking unusual nature; but yet few will regret that the year has passed, and that it remains now only in history. That it has been a year profitable to some members of the trade is, perhaps, probable, but only to a very limited number, and the vast majority will look back upon the year with remembrances merely of the limited profits they were able to effect. In cases they have for a long period had to endure an almost entire absence of business, and to put up with the anxiety occasioned thereby, but such have not been the worst off, for many a transaction has had to be carried through at a positive loss. But, taken all round, the total amount of business transacted has been fairly large, if we look at the actual turnover, heavy indeed has been the quantity, and this not only heavy in itself, but compares well with corresponding periods of previous years. But yet this has all been done at a minimum, or, perhaps, no profit at all. Outsiders have looked on at the trade; they have seen from time to time satisfactory Board of Trade Returns, heavy deliveries for consumption, and have thereby been led to believe that the metal trade has been in a satisfactory condition; but it is not so. These are, indeed, signs that the requirements of the trade are growing, and so far so good; but it is little satisfaction to do business at a loss. Remunerative business is what is required; but the reverse of this has been the general characteristic of 1883. At times there has been an inclination manifested to make up for the deficiency in profits upon regular business by speculation; but here there has been little success, prices have constantly receded, and confidence has rarely, if ever, been thoroughly established. All manner of influences, both inside and outside the trade have worked simultaneously together to depress the markets, to damp the tone, to destroy all cheerfulness, and even when some of the most adverse features have been removed, and a little more spirit and vitality has begun to spring up, some fresh feature of an adverse nature has arisen to check it, and hence inflation or excessive buying have been things unknown, and any little spurt has been quickly followed by a reaction. Here we are speaking of metals generally, and one common feature in them all is that they are without exception cheaper now than at the commencement of the year. Prices were mostly low to start the year with; but they are now still more unremunerative. Some of them have touched unprecedentedly low figures, almost all have been comparatively cheap; at no time have any of them been dear, and to this cause we may attribute the excellent deliveries which have often been effected. The markets have been worst during the latter months of the year, and although they do not all close at their lowest points, yet they are still all in a more or less unsatisfactory condition. Political and monetary affairs have generally been in favour of the market, nevertheless they have not had that important influence which they usually do, and for the most part they have failed to form any stimulus to the demand. It is, of course, most unsatisfactory that, after all the fluctuations that have taken place, prices should be now so thoroughly depreciated in value, that holders after much anxiety should have to make very heavy sacrifices, and this more particularly because prices were by no means high to start the year with, and at no time during the past 12 months they have never been enhanced.

Tin, compared with other metals, has, perhaps, formed a slight exception, and been proportionately high; but yet it has generally ruled below its average, and certainly only a medium figure has been realised if we take into account the highest and lowest points ever touched. Heavy production all round has frequently formed a more or less serious drawback to the trade, supplies in excess of the demand often tending to weaken prices and depress the tone. Stocks in some instances have increased, and in others diminished, but there is not much to say with regard to the alteration of the statistical position of the markets; on this point the principal feature is, perhaps, in iron, in which, notwithstanding that the stocks are still much too heavy there is a very sensible reduction for the year. During the last few days of the year the tone decidedly improved, and a fairly satisfactory rise was effected in the value of copper and tin.

COPPER.—Owing to the favourable statistics which were published at the end of December, 1882, this market opened with a good tone in January last, and for the first week or so continued to gain strength, the tone being made firm from large speculative purchases, and also from the reported buying of several large parcels of furnace stuff. The total visible stock to start the year, which, with two exceptions, was lower than at the end of any month in the year, was 47,053 tons; and, while the demand generally was fairly brisk, for shipment it was exceedingly quiet. In the middle of the month of January the Chili charters were announced as only 300 tons, which was the means of further improving prices; but the higher rates which were then being quoted somewhat checked the demand, and business became decidedly small, and prices continued to fall until the first week in February, when Chili produce had lost fully 2½ per cent in value. The lower rates, however, attracted the attention of operators, and suddenly a marked change took place, prices advancing to about 65½ 10s., but receding again to 65½, at which figure the market kept steadily until the close of the month. In early March there was rather more business doing, chiefly for shipment, owing to the improvement which was effected in the Indian Exchange; but for consumption and speculation the demand continued very quiet, and, as the month wore on, a hardening tendency marked the course of prices, the rise being effected in a gradual manner, until the best part of the month had passed, when prices again took a retrogressive turn. Afterwards the market was easy, and then, to start the month of April, owing to a combination of unfavourable features—such, for instance, as a slow general demand, unfavourable statistics, and enormous Chili charters—the market was deserted by operators, and prices receded, with but little check, until the end of April. The tone was greatly depressed, and scarcely any effort was put forward to stay the downward course. So many unfavourable features existed that operators thought it advisable to leave the market alone.

In May the price of Chili bars continued to fall until 61½ 7s. 6d. was touched. This low price was the natural result of a paucity in business, nevertheless it again encouraged buyers into the market, and for the greater part of the month prices rallied, recovering much of what they had already lost. Speculative buying was large, and in consequence the rise that was effected was done in a very fluctuating manner, and it was unsatisfactory to note that while the fluctuating demand was active, orders for the ordinary wants of the trade were scarce. During June the market was fairly steady; there were slight fluctuations, but nothing very marked, of about 2s. 6d. or 8s. per ton—sometimes in one direction, sometimes in the other. The tone was but mere marketable fluctuations, and no importance were attributed to them. Holders generally were firm, believing the price to be already quite low enough, and certainly there was nothing in them to form the slightest interference with the genuine demand. At the beginning of July there was a decidedly easier tendency, and reduced prices were accepted, but a slight rally followed, and then for two months the market kept extremely steady, although more or less neglected. During that time there was no special feature in the market; but it was undoubtedly noticeable that holders for the most part, whilst refusing to make concessions, were also very ready to avail themselves of the slight improvement in prices. In July the deliveries were very fair, whilst in August they were about the heaviest on record; nevertheless, for shipment transactions were of a very hand-to-mouth character. The difference in price between cash and forward prompts at one time during August was very slight, showing that there was not much confidence in the future, but at the same time the good deliveries which were being made helped to support the market.

For the greater part of September the market was steady, but towards its close there was an easier tendency. Owing to the good deliveries the heavy Chili charters which were announced at the commencement of the month had but little effect upon the market. The continuance of a heavy supply, however, formed a great drag to the market, and, therefore, notwithstanding that the deliveries were sustained there was no relief afforded whatever. Whilst

August was noted for its unprecedentedly heavy deliveries, September was remarkable for its unprecedentedly heavy supplies. This naturally produced a very depressing influence upon prices, and for the first fortnight in October some heavy sacrifices had to be made. A slight improvement then followed, which, however, was destined to be short-lived. It had its origin from smelters buying rather more freely, which induced operators also to renew purchasing. There was no confidence whatever in the little rise owing to the large supplies. Throughout the whole of November prices continued to recede, and holders who had often been very successful in sustaining their market, were no longer able to support their prices. Firmness here and there was of no avail, because the majority of holders were anxious to rid themselves of their stocks. Occasionally an effort was put forward to stay the downward course, but it only succeeded for a very short space of time, and continued reductions were the principal characteristics of the market, and for the greater part of December prices continued to fall in a very marked manner, holders all round showing much disposition to press sales; but on the eve of Christmas a perceptible change for the better was effected, and prices of Chili bars having touched 57½, afterwards fully recovered 20s. per ton, but no very great increase in the amount of business was transacted, and prices close for the year steadily at the improved rates.

IRON.—On the whole, this market has remained steady during the past year, but prices have receded for both the manufactured and the raw material. At the opening of the year the market was dull, and, in fact, throughout the whole of January it was depressed, and buyers showed no disposition whatever to avail themselves of the falling rates. In early February no change for the better was visible, and prices continued to decline in value. Very few works indeed were going full time, and at about the middle of that month strike difficulties arose between the employers and employed. These difficulties have perhaps been one of the principal characteristics of the market during the year; often have they existed to depress the market, often have they been the cause of delaying deliveries, and frequently have they formed a check to business, because merchants have been unable to place their orders with an open delivery. One satisfactory feature in the market was a sensible reduction effected in the public stocks, both in Scotland and Middlesbrough, but this did not encourage the speculative demand, and here we may state that speculative business in Scotch pigs in the year just past has been noted chiefly for its absence, hence great fluctuations have not occurred, and prices have ruled at a low level, so much so, that towards the latter part of the year, the tendency was to gradually restrict the production, but not to materially increase the demand. Whilst the demand generally remained inanimate, yet there was one exception, and that was briskness in the shipbuilding trade, and busy employment was reported in that branch of the labour market. The advices from almost all the leading manufacturing centres tended to show excessive quietude; nevertheless, in one or two places, a few good orders were given out, but these were exceptions, and enquiries generally were scanty, although for the commoner classes of iron they were slightly more numerous, but rarely resulted in actual business.

As March commenced the market began to assume a better appearance, and orders were slightly more plentiful, and an increased amount of briskness was visible at most of the works, and the tone manifestly strengthened, while sellers were no longer willing to make concessions, and continued strong and steady for all classes of iron except for Scotch pigs which, at the early part of the month, were somewhat reduced. Notwithstanding, however, this general slightly better state of the market the recovery was not unanimously pronounced, and at a few of the works there was a great deficiency of orders, and, therefore, the trade could not be said to be wholly in a healthy position, while the little better feeling which had arisen was not destined to be of long duration, and before March had closed the whole trade was once more characterised by extreme quietude. Prices for some descriptions at the beginning of April were easy, but at the Quarterly Meetings which were held about that time there was no material change effected in prices, while business all round was reported dull. This led to the idea that current rates then were unprofitable, otherwise it was thought with the limited business that was doing sellers would have reduced their rates in the hope of stimulating the demand. Advices from Glasgow showed a continuance of good shipments, and the large public stock was also dwindling down, but without causing any improvement in prices. In general merchant iron the shipping demand especially kept slack, though some fair exports were occasionally made in execution of old contracts. At the end of April the reduced value of coal caused the market in Staffordshire to be a little irregular, and notwithstanding that in the then ruling prices there was nothing to interfere with business, yet nearly all classes of iron kept slow of sale. To start the month of May there was every evidence of bad trade; manufacturers were easy in their quotations, hoping thereby to encourage business, but this was not so with all sellers.

Many were the complaints of the unprofitableness in doing business at the prices that could be realised, and several sellers preferred to let orders pass by them than to make further concessions, arguing that it was better to do little or no business at all than to carry through transactions at such heavy sacrifices. About the middle of May, however, a slight change for the better was recorded, and some of the works were able to get more regular employment; but, at the same time, the trade was in a very unsatisfactory condition, and from many of the chief centres of the iron industry a paucity in business was reported, and some of the mills were closed altogether. Pig-iron was also very dull; over-production was said to be the parent and root of the existing evil, and until makers abandoned their suicidal policy of putting fresh furnaces in blast there was no hope of any recovery in prices. In June there was no recovery, the demand throughout keeping sluggish. At the end of that month the determination which Cleveland makers had come to, upon a combination to fix the prices of pigs in that district, was brought to a close, and although no reason was assigned for having abandoned the course, it was thought that the probable general opinion amongst them was that no good would be derived by associating together to uphold the market. The trade then was in such a depressed and deplorable condition that too much firmness would undoubtedly have tended even to still further reduce the already limited business, and, therefore, it was evident that the Cleveland makers arrived at a wise and sensible conclusion in not binding themselves to various rules and restrictions and keeping up their prices against their customers.

The chief event to start the month of July was the great strike which then took place, and which affected the whole of the Staffordshire and Midland centres. The relations between masters and men had been strained for many months, and the dissatisfaction which had long existed among the men at last culminated in a strike which will ever be memorable for the disgraceful riots that took place. The works that did not close were attacked by disorderly mobs, and could only carry on business under adequate police protection. The strike spread far and wide; some of the men went out merely from intimidation, and it was said that for recklessness and folly, bitterness of feeling, wilful and wanton mischief, the strike was unequalled in the history of the iron trade. In the middle of July the men gave in without having done any good for themselves whatever, and business was again begun at the several works, and before the close of that month the trade was fast resuming its old dimensions, being for a time brisker, owing to the back orders that necessarily had to be executed. At the same time, although business was kept going, yet the strike difficulties were not wholly settled, and among a certain number of the men, although not by the majority, there was an inclination to renew the strike. As August progressed no improvement was manifest in the demand, and prices took a rather easy tendency. A peculiar feature in the market then, and which has also since existed, was the fact that in Middlesbrough prices for forward prompts were actually less than those for cash parcels. This, of course, signified that operators had no confidence in the stability of the market, and recent experience has shown that those who entertained this idea were correct in their surmises, for prices have since receded.

The advices in early September from all the finished iron centres showed that although some mills were fairly well occupied with old contracts, yet there were unanimous complaints that new orders

were difficult to secure. Public stocks were also slightly increasing in Glasgow, but diminishing in Middlesbrough, and speculative as well as ordinary buying was inanimate. Prices all round kept exceedingly low, and it was a generally recognised fact that sales could not be made profitable at anything below those figures, while it was even questionable whether the quotations left any margin of profit at all. Strike difficulties having been settled, at all events for a time, it was hoped that the trade would enjoy a little quietude from these disturbances, but they broke out in Yorkshire and other parts, and again once more disorganised the trade in many of its branches. At the beginning of October, while a few works were fairly well employed, yet in the majority of instances there remained a scarcity of business, and some of the works were obliged to close. Quotations were quite nominal, as many sellers were willing to accept almost any prices rather than allow orders to pass by them. Later on the slight advance in the price of coal created a stiffening tendency in the value of iron; but buyers generally were very shy to pay any advance, and as October wore on more strike difficulties in certain centres of the trade also helped to make the market stronger. The advices from Staffordshire showed that the trade there was improving only slightly, yet sufficiently to leave room for encouragement, and make manufacturers more hopeful that the times of depression were drawing to a close, although in other parts of the country trade kept in a dull and monotonous condition.

In November an easy tendency pervaded the market for the raw material, but manufactured remained steady. This may have appeared surprising, for during that month, in the raw material, there were many features to give tone to the market and implant confidence—such, for instance, as reduced public stocks, the damping-down of furnaces, and very good shipments—whilst for manufactured there was very little doing—only enough to meet the most urgent and pressing requirements of the trade. The chief cause of the stiffness of the market was the great uncertainty which existed as to a serious strike in the coal trade. The men gave in their notices, and the masters refused to meet them, so that the ironworks had to push on with the orders in hand to prevent any delay in delivery, which would undoubtedly have taken place had the strike actually occurred. In early December various notices for reduced rates of wages were posted at several of the works, signifying the continuance of the bad state of the trade. Prices, on the whole, tended downwards, the principal fall being in Scotch pigs, which lost about 1s. to 1s. 6d. in value. In some districts shipbuilding was brisk, but in others it was very inanimate. Throughout the whole month there has been very little buying for forward delivery, the prospects being considered to be attended with much uncertainty, and in Staffordshire the list houses are said to have been very badly off for orders; but at times the suppliers of commoner qualities of iron have held a fairly large number of contracts. The demand for speculation continued dormant, and there were strong evidences existing in the trade of the almost absolute necessity of a considerable curtailment in the production throughout all parts of the country.

TIN.—During the past year this metal has been largely speculated in, and, in consequence, prices have fluctuated to a very great extent. It opened with an easy tendency at about 94½ per ton for cash parcels of foreign, and after undergoing many changes it lost about 20s. per ton in value in the course of the month of January. A moderate business at times was done to meet the regular requirements of the trade; but transactions were chiefly to satisfy the wants of speculators. Supplies were kept above the legitimate wants of the trade, and in consequence stocks were increased, a feature which tended to weaken the market in the early days of February, and to some extent induce operators to "bear" the market. The fall was continued for some time; but, as is usually the case after a serious reaction, a rebound follows, which proved to be so in this metal, and a sharp recovery ensued; but, after many variations the price again fell away to much about the same figure as that realised at the early part of the month, although statistics were much more unfavourable, showing an increase in the public stock of over 800 tons. In March there was a strong upward tendency, speculative buying was very spirited, and considerable advances were made in prices. It was difficult to fathom any reason for this sudden enhancement, except the speculative influences which were at work, whilst advances of 7s. 6d. to 10s. per ton per day were of frequent occurrence. A noteworthy feature throughout the first three months of the year was a steady augmentation each month in the deliveries; but supplies were also maintained above them until the public stock had swollen to 17,360 tons, the heaviest stock recorded at any time during the year. The price during the last few days of March began to recede, and after many fluctuations in April, sometimes one way sometimes another, it gained ultimately about 10s. per ton. The features in the market during that month were a large speculative business, an excellent demand for consumption, somewhat diminished supplies, and a reduction in the public stock of over 1000 tons; but, notwithstanding all these favourable features, the market took a retrogressive turn, and prices were weak during the first few days of May, it being thought that as the tin-plate trade was then very quiet consumers had bought rather too freely in the previous month, but whether this was so or not deliveries were certainly not kept up on such a large scale. Nevertheless, operators did not continue to take a despondent view of the market, and succeeded in again obtaining better rates; but at the close of the month there followed a somewhat serious relapse, whilst no change was effected in the statistical position of the market. Until the last few days of June prices further receded; but the diminished value of this metal stimulated the demand for consumption, and the deliveries for that month were very heavy, amounting to 2263 tons, the largest for any month during the year, and in consequence before June had ended prices had recovered somewhat of what they had previously lost, whilst the public stock was also diminished by a few hundred tons. During the first half of July there was a downward tendency, and operators were not disposed to purchase except in limited quantities, which was attributed to the high value of this metal compared with others, a feature which has generally been a characteristic of the market throughout the whole year. A sharp rebound, however, followed, the spurt doubtless arising from the combined strength of holders, who had a material interest in the advancement of prices; besides, the deliveries were fairly well sustained, and no material alteration was made in stocks.

In August the changes were not very great, although at times the demand was rather spirited; there were constant fluctuations, the ultimate result being to leave prices at the end of the month about 15s. lower than they were at the beginning. Deliveries were not so good as they had been in the two previous months; but, nevertheless, compared favourably with corresponding periods of previous years, while supplies also being more limited, the visible stock was in consequence slightly reduced. During the greater part of September prices continued to harden, good deliveries and a large consumption in America being the chief reasons of the strong prices; but at the same time for the whole month stocks were slightly increased, and deliveries were rather diminished, compared with the previous months. Nevertheless the deficiency in the genuine demand was fully made up by extra buying for speculation, and holders who availed themselves of the improved rates caused thereby have every reason to be satisfied with their contracts. At the end of September, and during October, a peculiar feature in the market was the price for forward tin, which was often even lower than that for cash parcels—a feature which indicated no confidence in the future, and recent experience has shown that some insight was gathered thus early of the prospects of the market. Although deliveries during October were extremely good, prices lost over 2½ per ton. Throughout the whole of November the market was completely disorganised, heavy sacrifices were continually made, deliveries were reported very good, but they formed no check to the downward course, and although several attempts were made to stay the drooping tendency they all proved useless. Prices during that month lost fully 6½ per ton, although the closing figure was not the lowest point touched. In the last month of the year this market has been very unsettled, and on account of large speculation, both for the "bull" and "bear" account, wide fluctuations have constantly been a principal feature of the market. For the greater part of the month the "bear" operators managed to turn the market in their favour, but during the last week of the year the "bulls" have been the successful

Original Correspondence.

GUINEA GOLD COAST MINING COMPANY.

SIR,—I thank you for publishing in your Journal of Dec. 15 my letter in reference to the above company, but I regret that the problem—to find John's shaft—has not yet been solved by any readers of the *Mining Journal*, and the solution is still withheld by the directors, notwithstanding other shareholders besides myself have applied for it. I must confess that the reticence of the board, and the sealed lips of the secretary, do not inspire me with confidence, and I would suggest as a remedy for the dumbness which exists, a special general meeting being called, and if a sufficient number of shareholders will co-operate for that purpose, we shall very soon know whether John's shaft is, or is not, a myth.

A. O. S.

City, Jan. 2.

GOLD MINING IN THE TRANSVAAL.

SIR,—I have read in your last two *Mining Journals* various letters relating to gold mining in the Transvaal. As this subject is likely to become one of very great interest to the investing public you deserve the thanks of the community at large for allowing this mining matter to be so thoroughly ventilated in your columns. About two years ago a company was formed, with an American colonel at its head, the object of which was to acquire from Mr. H. Gwynne-Owen the two farms Lisbon and Berlyn (it was spelt Berlin in those days). The amount to be paid for the farms was 44,000*l.* Mining engineers were sent out by the company (the South African Syndicate Company) to report on the property, amongst them were Mr. Webster and Mr. Hamilton. These reports were of such a favourable character that the syndicate shares rose rapidly in value from 24*l.* to 75*l.* each, and I believe many were sold at this last figure. A company called the Balkis Company was to have been brought out last July in which 400 shares were to be allotted to the holder of each syndicate share. We, the South African Syndicate shareholders, were told that Mr. Albert Grant had offered Mr. Owen more favourable terms than those contracted with us, and at the last moment he (Mr. Owen) had refused to convey his farms to us only on absurd and impossible terms. We next hear that an action has been brought by the Syndicate Company against Mr. Owen for 750,000*l.*, the estimated value of the farms, but after this we are kept in profound ignorance of the further proceedings of the Syndicate Company.

The next startling episode in the history of this transaction is the appearance of the prospectus of the Lisbon-Berlyn Company, in which Mr. Albert Grant and H. Gwynne-Owen appear as vendors, and the modest amount asked for the farms is 500,000*l.* The mining reports of Messrs. Webster and Hamilton, and the description of the quartz by Prof. Heddle, all of which the syndicate paid for, are now advertised as the property of the Lisbon-Berlyn Company. Surely there are many shareholders, like myself, only waiting for an opportunity to combine and have the mystery solved.

A SYNDICATE SHAREHOLDER.

THE KIMBERLEY DIAMOND MINE.

SIR,—Will you kindly allow me a little of your valuable space to refer to a letter, signed by Mr. Thomas Collingwood Kitto, on the Kimberley Diamond Mine, that appeared in the *Mining Journal* of Oct. 27 last. He says that "Mr. Watson's report, coupled with the republication of my letter," &c., "appears to have driven some persons in Kimberley almost frantic." Although taking a very great interest in the Kimberley Mine, with which I have been connected ever since the opening, I was not aware, until reading the above, that any communication from Mr. T. C. Kitto would have the smallest effect on Kimberley people, one way or the other, unless I except perhaps a little amusement. But Mr. Watson's report did have a very great effect, as his position as C.E. and Chief Resident Engineer of the Midland Railways of the Cape Colony, and therefore a man intimately connected with the removal of large quantities of gravels, &c., did not prepare people here for two very serious mistakes in his report, that have certainly conveyed very erroneous ideas of the position of the Kimberley Mine. I refer first to his statement on page 8 of his report, that the size of the 16 cubic foot truck-load of loose reef, which is the standard load of the Kimberley Mining Board, did not represent more than 72 cubic feet of solid reef, whereas the Mining Board always reckoned it as 10 cubic feet, or nearly so, and in the report of Captain Erskine, the Government Inspector of Mines (a gentleman of considerable attainments and undoubted integrity, entirely unconnected with the Kimberley Mining Board, in fact, often antagonistic to it) for 1882, page 5, the size of the load is put at nearly 10 cubic feet.

Immediately on receipt of Mr. Watson's report the Government Inspector of Machinery was good enough to make careful and exhaustive trials as to the actual size of the ordinary 16 ft. truck load, and he brought it out as equal to 98 cubic feet solid. Now, a difference amounting to very nearly one-fifth in the standard measure, by which, according to his own showing, over 12,000,000 loads would have to be measured, is, to say the least of it, a very gross mistake, considering the undoubted evidence lying in the various Government offices he had at his disposal. The other mistake, equally unwarrantable in a man of Mr. Watson's position, was that, in reckoning the total cubes of the ground excavated, and to be excavated, to stop the sides of the mine back to an angle of 30° from the edge of the hard rock to the surface, he treated the diamondiferous soil already removed as a perpendicular column, instead of as the frustrum of a cone, the lower or smaller end of which he measures approximately as an ellipse, the axis of which being respectively 700 and 500 ft., giving an area of 30,543 yards, whilst the area of the upper end was always open to him at the office of the Inspector of Claims in the shape of the plan of the mine as it was originally opened, and an account of the claims for which licenses were paid after the reef had been sufficiently defined all round, the mine giving an actual area of 502 claims of 31 by 31, or 53,636 yards; yet, on page 6 of his report we find it stated that—"In fact, many claims were worked out before the level of the hard rock was reached; but for the purposes of this report the circumstance may be neglected." This error accounted for something like 3,000,000 loads out of the total number which Mr. Watson's report told the world would have to be removed from the Kimberley Mine before safe working could be resumed, but which he unfortunately does not even intimate could be removed as heretofore simultaneously with the working of diamondiferous soil. I can only account for Mr. Watson's falling into the above errors, as many other minor ones, by carefully keeping in mind what he says himself on page 5 of his report:—"On inspecting the mine I came to the conclusion that it would be useless to attempt by survey and measurements to obtain independent information of any value within the time at my disposal, I, therefore, endeavoured, to collect from different sources the information which I required."

Seeing the unfortunate effect that a report of this nature must have, a private company in Kimberley Mine at once engaged competent men to survey the mine, and get exact and, in every way, thoroughly reliable data. These surveys have only quite lately been finished, and are not yet published; but I know from them that the cost of making the sides of the mine safe, by reducing them to an angle of 30°, as recommended by Mr. Watson, will be, at 2s. 6d. per load of 16 cubic feet, 835,000*l.*, and not 1,754,625*l.*, as he states. (Since writing the above the reef tariff has been reduced to 2s. 3d. per 16 ft. load, thus making this work still lighter.) There is one of Mr. Kitto's remarks that shows, perhaps, more than another that he has not lately kept the run of Kimberley Mine—that referring to the advisability of Government taking over the management of the mines.

He is evidently, and perhaps many of your readers are equally, ignorant of the fact that during the last session of the Cape Parliament a new ordinance was passed that entirely reconstitutes the mining boards, and does away with the liability to a repetition of the many gross evils that are perpetrated under the old ordinance, as it gives effect to appeal from all the principal Mining Board enactments, such as assessments and reef and water tariffs, thus preventing any of the unfair taxation and waste of the resources of

the mine by irresponsible parties that obtained so long in Kimberley to its serious detriment, though by no means total ruin.

Also that stringent searching rules and regulations are being put into force, which we hope will have the desired effect of checking that terrible scourge to the fields—thefts of and ill-fitted trade in stolen diamonds.

As to the last part of Mr. Kitto's letter, I can only say that unless I had his written statement of the fact I certainly should not have believed that anyone had offered 30,000*l.*, or even 10,000*l.*, for Mr. Kitto's favourable report, and that he had refused it. However, it must be so for he says it.—*Kimberley, Dec. 6.*

P. W. T.

THE BENGAL BARAGUNDA COPPER COMPANY.

SIR,—I have just heard from Calcutta that this company is creating an intense excitement, owing to the discovery of a grand well-defined lode of rich copper; and as this, with the exception of one small mine, is the only one in the whole of India, it is impossible to put a value on the property, considering that at the present time tens of thousands of tons of copper are imported into India, which now this company will be able to supply.

AN OLD INDIAN.

MINING PROGRESS IN BRAZIL.

SIR,—Since my last writing the workmen at the Descuberto—or, as known in England, the Brazilian Gold Mines (Limited)—have received notice to quit, and evidently the limit has been reached. I have had occasion to urge your readers to be cautious with regard to this undertaking, and now it is time for the shareholders to ask for the letters written by Mr. Lott, the first superintendent, to the directors in London. Mr. Lott, who is well known here as an honest and capable man, was well acquainted with the mines of the country, and he was too conscientious to go on with the works as directed by the London management, unless the directors of the company were made fully aware of the condition of the so-called mines and the prospects. The result was his discharge. If any shareholder is curious enough to see what advice the first superintendent gave to the directors he can no doubt find the letters on file at the office, if not, he can apply in Brazil.

The company leave off with as good prospects as they began, and they are *nil*. "Pounds of gold in the safe" did not seem to inspire the shareholders with much confidence when they were asked to part with other "pounds" in exchange for bonds. I am curious to know what was the motive in publishing those extraordinary letters over the signature of John Lean, about the time the company was started. Perhaps Mr. John Lean will tell now that he has been handled a little roughly by the company. The matter is finished, as I told you plainly it would be, without good results.

As I am a "vulture," so Mr. Schofield said, naturally I hang around the unhealthy carcass of the "King of Gold Mines." It is my opinion that the course of the London managers cannot be too severely criticised. They seem so anxious to get rid of that "reserve money" which the bondholders hoped was so much security for them. The late superintendent, Mr. Morrison, urged that no more machinery be placed on Cuiaba until the ground was opened and a good mine found; so apparently to show that a London company must not be dictated to by a resident manager, it was immediately ordered that more expensive stamps be put up, and it was done, with this result—the company have a fine large costly mill at Cuiaba, with ore not good enough to pay expenses. London management is usually of little value, and in the case of the St. John del Rey Company, if ever it is investigated, I think the remarks that have been made respecting it will appear tame compared with the facts. They buy the Jaguará estate, which has been in the market for years, and with it a steamboat. They would undertake to supply themselves with timber. Mr. Dumont, who owned the steamboat and estate, stopped the business some eight years ago. With his own slaves to work the business was not good enough for him; but then London gentlemen may think that they can do better. So far it has resulted only in painting and fitting up the steamboat, which I last saw at Sabará.

Perhaps the St. John del Rey Company can do better in their costly way than the former owner could do with his slave labour. I presume the steamboat will be piled up soon with the quantity of costly machinery for which the company have no use. The water-wheel (I call it the Schofield water-wheel) which Mr. Schofield proposed to have finished in 1882, is lingering on—no one can say when it will be completed. A large number of miners and other workmen have been discharged from Morro Velho; some find work at Raposos and Passagem, others go to the railway, and some return to England. This saving to the company may amount to a few hundreds of pounds per month, but some departments of the work will miss the help. The Morris machinery and the steamboat business cost some 7000*l.* Money is spent to hold a stream of water which the company do not and never have wanted; but it was done in order to keep other parties from using the water. The company could not hold this water one day if anyone wanted it for actual mining use.

I take back all I have said about "dividends"—I cannot see any ahead. The usual course I suppose to follow—after the reserve is eaten up fresh debentures, but with a better rate of interest, &c. Certainly if common report be true there is every effort made by Mr. Oldham and his associates to do the best they can. We are deep in mud, and under water, the rainy season being fairly on. MINAS

Congonhas, Dec. 5.

COLORADO MINES—THE STANDARD, OF MONT BROSS.

SIR,—This property consists of a group of seven mines, all on one course of mineral ground extending for about one mile in length. They are in the centre of the richest portion of the mountain, about 2000 ft. above the valley of Buckskin Creek, two miles from Alma, with good roads leading thereto. A description of one that has been fully developed will apply to most all the others. The Excelsior has two lodes and a cross-course; it was worked many years ago, I think as early as 1860, at a time when the operators did not understand the method of saving gold and silver, although the ore was both rich and abundant; recently a little work has been done by a Pennsylvania company, but they are deficient of capital. A wire tramway has to be erected to run the ore from the mines down into the valley below to save carriage over the mountain roads. The main lode, called the Excelsior, has a course north 40° east, magnetic, dipping at 80° westerly; it is in the lower beds of the Devonian, chiefly quartzite, limestone being the superincumbent strata. It varies from 3 to 20 ft. wide, containing payable ore all the way as fast as sunk on, which is about 180 ft., with drivings to the east 550 ft. in length from the face of the cliff. A shallow adit on the outcrop of the lode is driven in 99 ft., this is also in good ore; there are some deeper workings about 700 ft. below, which I have not yet had time to examine; but I am told there is no diminution in the quality of the ore, or if there is any difference it is richer in gold and copper. Stopes in the back of the middle level have been carried up 40 ft., a cross-cut has been put out for 25 ft. on each side of the level, and no wall yet reached, thus showing 50 ft. in width of ore of various grades. Near this a porphyry dyke crosses nearly at right angles. I am inclined to think this had some influence in opening the lode to such a width, making an immense pocket. At the end of the level the miners carried only 3 ft. in width, which is on what appears to me to be the leader of the lode. No cross-cut has been made at this end of the mine, so its actual width is unknown. The lode consists of the following:—Silver ore, 18 in. thick; hematite iron, quite solid, 9 in.; quartz in veins, 6 in.; carbonate of copper, 3 in.; the matrix of the silver ore is a light ferruginous lime, with enough alumina to make it compact. It is much stained with protoxide of manganese, and full of little cubical pieces of magnetic iron. Taking the silver-bearing ore alone at 18 in. thick, we find by analysis that its specific gravity is 3.20, which is equivalent to 209 lbs. per cubic ft., and at 18 in. in width gives 5-64 tons (American) to the lineal fathom.

Its assay value is \$91.80 per ton, by 68 ozs. silver at \$1.10, and 15 dwts. of gold at \$20 per ounce; the copper is not taken into account, making the lode at this end worth \$517.75 per fathom. Near the porphyry dyke is a small diagonal vein with ore assaying 500 ozs. in silver, and 2½ ozs. in gold. I broke some of this and have it now in my office. I advised the superintendent to let this stand

as a sample of rich ground, as it would confirm statements that have been made of what the mine has produced in the way of rich ore. The little carbonate of copper vein looks very beautiful, much of it is azurite; it is cellular in deposition, the cavities are coated with an efflorescence of copper that runs high in silver. In the lode are lenticular pockets filled with brown amber exceedingly fine, pulverulent and unctuous. If this is collected and calcined it would be sold as burnt amber, and worth in the market \$40 a ton as a pigment. I think it can be utilised in its raw state by merely washing and precipitating the grit that it contains. I have often seen similar nests like this in the Cambrian slate rocks of North Wales. The next lode is the Anaconda or Paris; its course is N. 55° E. A shaft has been sunk on it 55 ft. deep, it is an immense lode. At 15 feet a collar is put in and drivings commenced east and west, and it is 6 ft. wide. At the time I measured it men were working it, and a nice pile of ore was stored in the shaft-house. Commencing at the foot-wall we find 12 in. of bright gold-bearing gossan, then 36 in. of nearly solid hematite ore that will yield 50 per cent. of metallic iron, then 36 in. of silver ore of the same density as described in the Excelsior lode. The gossans are very light, the specific gravity being only 2.60. Now, in ascertaining the contents of the marketable part of the lode we must take 1 ft. at 162.5 lbs., and 3 ft. at 209 lbs.= 14 tons of 2000 lbs. to the lineal fathom of lode. The average assay is 1 oz. of gold, and 40 ozs. of silver—value, \$64 per ton. By concentration, if great care is taken in the washing the concentrate may be brought to \$192 per ton. The lode is so soft that it may be worked almost entirely by the pick and gad. The gauge is about the same as the other lode, but it contains little reticulated veins of crystalline calcite. The colouring is by an hydrate of iron; it has also stainings of manganate.

Of the iron I can put no immediate value at present, as there is a market for it within a reasonable distance; it is of a very dark colour, nearly black, very dense and hard, specific gravity, 3.70, weight 231.25 lbs. per cubic foot, and yields at 3 ft. in thickness 7 tons per lineal fathom. I have not assayed it, but am told it carries a fair showing of gold. The present ends are, therefore, now worth \$916.80 per fathom without the iron. The cross-course spoken of runs N. 5° W.; a level has been driven on it for 150 ft., following a mineral vein 6 in. thick. A stope near the entrance has been put up about 18 ft., where the vein opened out to 2 ft., but I suppose it did not produce sufficient ore to pay; nothing has been done on it recently. I am very desirous of having this mine taken up by some of our London capitalists it is exactly suited for a syndicate, as it may be divided up into three large mines. I have applied to the owners for the price and terms of purchase, and have got an offer from the owners of four out of the seven mines at a very reasonable figure. If I obtain the others I shall prepare a map and illustrated geological and mineral report, and send it to the *Mining Journal* for the inspection of any party who may desire to make a profitable investment. There is another mine adjoining this that produces very fine ore, but the price put on it is so enormous that I cannot take it up or advise any of my friends to do so.

Alma, Dec. 15.

CHAS. S. RICHARDSON, G.M.E.

AMERICAN FORK AND SILVER LAKE MINING DISTRICTS.

American Fork and Silver Lake mining districts adjoin Little Cottonwood with the north boundary line by Wellington, Emerald, and Peruvian Hills. The boundary between American Fork on the south, and Snake Creek district on the north, is formed by and through Pittsburg Hill. The principal characteristic geological formations of these districts are—Dolomite or magnesian limestone, schist, quartzite of the Lower Silurian and Devonian periods, and underlying all the granite—just the same as they overlie the granite of Little Cottonwood, and as they overlie the granite of Utah and Blue Ledge mining districts. The Silurian and Devonian limestones overlie the quartzite, from which they are separated by a thin bed of schist, 10 to 40 ft. in thickness. These limestones appear in beds and strata, and assume the most grotesque forms—ridges, towers, spires, and battlements, and represent a mass from 1000 to 2000 ft. in thickness.

Through this limestone and quartzite break American Fork, South Fork, Deer Creek, Dry Canyon, Mary Ellen, Major Evans, and Porcupine Gulch as so many large, main, and tributary channels formed by the great ancient water-courses and upheavals, leaving the broken and twisted lines of the strata on either side of the channel facing each other, and so appear as eternal sentinels and monuments, clearly indicating the position which they once occupied in remote ages, and at the same time convincing the observer of the great upheaval and mighty disturbances which have taken place here. We will observe that if it were in our power to press back these hills to their former position that all those broken and disjointed lines would be brought together, forming again one whole and continuous line of stratification. It would appear and clearly demonstrated that prior to the great upheaval the country was a more or less horizontal plane was covered by a huge mass of limestone, 1500 to 2000 ft. in thickness, and when the mighty subterranean powers exerted themselves in their united efforts pressing on and upwards they broke and upheaved, twisted and turned over and over the whole enormous mass of rock above them, and formed hills, canyons, gulches, and ravines like those we see at the present time rising with solemn awe-inspiring grandeur, with their hoary snowcapped heads high up among the clouds of our beautiful Utah, with this difference, however, that at remote ages they appeared grander still, and yet having undergone the influence of the power and action of glaciers, water, and air. In the ravines of American Fork are met everywhere immense boulders torn from their original bedding by the power and action of the ancient glaciers. Coming across the divide from the Wellington or Albion Mine of Little Cottonwood we observe a fracture in the rock of a considerable extent. On the east side the schists to a thickness of from 1000 to 3000 ft. are predominant; on the west side the younger sandstones prevail. This line of fault can be distinctly traced from the divide down the canyon through the mines of the Cariboo Mining Company on Mineral Flat, and through the mines of the Miller, Wyoming, Dutchmen, Live Yankee, and Mary Ellen, have drifted for more than 1000 ft. on the vein. The reason for the fact that these deposits have not been opened beyond a certain depth is to be found in the extensive dislocations which have found place here, and which seem to be entirely foreign to most of the miners and mineowners of the districts. There are two main lines of disturbances in these districts; one break running north-west and south-east, throwing north-east, carrying the western portion of the lodes downwards and upheaving the eastern part, and another break or fault running north and south diagonally to the first break, separating the already dislocated parts further yet. It is very suggestive to connect the dislocations and disturbances which found place during the time of the second upheaval, which are so clearly illustrated in these parts of the Cottonwoods around the Emma and Patsey Marley Hills. Here we find beds of limestone and schist upon the granite dipping at an angle of inclination of from 30° to 40° east—a long distance off from the place from which they evidently were originally torn. The character of the ores in American Fork and Silver Lake are as follows:—Galena, carbonates, chlorides, bromides and sulphates of silver, ochreous earth, iron, and porous quartz, constitute the majority of the vein material or gangue, as a result of the oxidation of argentiferous and auriferous minerals.

The most characteristic ores are—Galena, cerussite, silver glance, copper glance, and free gold. The components of the ore are numerous, and comprise—Galena, sphalerite, pyrites, jamesonite, argentic wad, staphanite, cervantite, boulangierite, mimetite, simonite, bronzyrite, anglesite, cotunnite, crookesite, and kaolin.

The principal mines in these districts are the Miller Mining and

Smelting Company's mines, comprising Miller, Wyoming, Alpine, Tonto, Tom Green, Miller West Extension, Sarchfield, and Aspinwall, developed by the Car, Lady Annie, Emmeline, Alpine, Wyoming, and Mormon tunnels, crossing the entire hill diagonally in an easterly and westerly direction, cutting the lodes at various depths to a depth of 400 feet below the surface, and over 26,000 feet in length of drifts, levels, inclines, and shafts. Value of the ore, \$47 to \$130 per ton. Veins from 3 to 38 feet wide. Mary Ellen, Live Yankee, Live Yankee 1st, West Extension, Powers, and Quartzite, owned by Messrs. Delany, Mat Cullen, A. Campbell, Burk, and O'Brien, of Boston and Salt Lake; contact vein between quartzite and limestone 30 to 50 ft. wide, developed by thousands of feet in numerous tunnels, levels, drifts, shafts, and adits. Value of the ore, \$20 to \$130 per ton. Silver Bell, Mono, Eudora, First Chance, Henrietta, and Red Cloud, owned by the Silver Bell Mining Company, Michael Shaughnessy president. Contact vein between quartzite and limestone, 1 to 8 ft. wide, containing galena, chlorides, and bromides, valued at from \$80 to \$300 per ton. Developed by an incline to a depth of 400 feet, numerous drifts and adits, and a tunnel over 1100 feet long, which said tunnel at a length of 2200 feet will tap the lodes at a depth from 1200 to 1600 feet. Work continues vigorously by contract. Russler, Germania, and Excelsior, bounded by the Utah Consolidated Silver and Gold Mining Company; fissure veins in quartzite, 3 to 5 ft. wide, containing galena, carbonate of lead, and free gold. Lead ores sell at \$67 to \$130 per ton. Gold ore assays from \$130 to \$21,000 per ton. Developments are—one shaft 200 feet deep, two other shafts each 100 deep, and several drifts and adits. Lady Annie, La Belle, Bredemeyer, Cologne, Wacht am Rhein, Barussia, Meacoque, Sparrow Hawk, bounded by the Utah Consolidated Silver and Gold Mining Company; work on true fissure veins in quartzite, 3 to 8 feet wide, containing galena and carbonates of lead and free gold; lead ores sold at from \$47 to \$87 per ton. They are developed by numerous tunnels, drifts, inclines, and shafts, and one main tunnel which will tap all the ledges in Miller Hill at a depth of from 300 to 2000 feet. Lady Katharina and Rudolph, bounded by the Utah Consolidated Silver and Gold Mining Company; fissure vein in quartzite 6 inches to 3 ft. wide; value of the ore, \$37 to \$800 per ton. Character of the ore, chlorides and bromides of silver, and free gold. Developed by several adits, cuts, tunnels, shafts, and inclines. The north end of the Rudolph is situated on Bald Mountain, between 12,000 and 13,000 feet high; from this point a magnificent view is obtained over American Fork, Cottonwood, and Utah District, Salt Lake, Forest, and Heber City, Great Salt Lake, and Utah Lake.

To all of the mines of the Silver Bell and Utah Consolidated Silver and Gold Mining Company mill sites, containing magnificent pine timber and water-power, are attached. Sunday vein contains galena and free gold. Average value, \$230 per ton. Developed by two tunnels and one shaft. Treasure, owned by J. Chipman and Co., rich in lead and silver, vein 6 to 18 in. wide; developed by a long main tunnel on the vein and several inclines. Little Cloud, or Mountain Lion, owned by Frank Birk, Watson, Chadwick and Co., vein of very good smelting ore; well developed. Amayllis and New Compromise, owned by the Comstock Silver Mining Company, L. E. Holden, president, vein 3 ft. wide, containing galena and carbonate of lead, sold at from \$25 to \$87 per ton; developed by several shafts, tunnels, and drifts. Silver Dipper, vein 3 ft. wide, containing galena and carbonate of lead, valued at from \$47 to \$87 per ton; developed by several tunnels and shafts. Wild Dutchmen, owned by the Omaha Smelting and Refining Company, vein 3 to 5 ft. wide, containing galena and carbonate, sold at from \$30 to \$67 per ton; developed by over 10,000 ft. in length of tunnels, drifts, inclines, and shafts. Lost Maid and Wild Dutchmen Extension, owned by Sweeney and Co., vein 3 ft. wide, containing galena and carbonate of lead; well developed. Austin, owned by J. Tierman, vein of milling ore 3 to 5 ft. wide; extensively developed. Cloud Burst, owned to the estate of W. Willott and C. Burgess, vein 3 to 6 ft. wide; developed through a main tunnel. Knight of Pythias and Oquirrh Encampment, owned by A. M. Bredemeyer, vein 3 ft. wide, has been traced for 3000 ft.; developed by a main incline on the vein. Sierra, owned by Salt Lake parties, vein in limestone, 3 ft. wide, containing galena and carbonate of lead, sold at from \$47 to \$67 per ton; extensively developed. Echo, Plum, Patrick Henry, Silver Wave, and Fraction, owned by L. H. Merrill and Co., veins 2 to 5 ft. wide, containing galena and carbonate of lead; considerable developments done. Belorophan, owned by G. Sperry and L. H. Merrill, vein 3 to 5 ft. wide, containing galena and carbonate of lead; extensively developed by several tunnels.

Atlas Company Mines, situated on Pittsburg Hill, vein in limestone. Developments consist in several tunnels. Missouri, owned by A. Ferron and the estate of W. Willott, vein of galena and carbonate of lead, 3 ft. wide, well developed. Orphan, Cariboo, Utah, Sunshine, Anna, Hattie, and Diehl, owned by the Cariboo Silver Mining Company, contact vein 3 ft. wide, containing galena, valued from \$30 to \$130 per ton. Considerable work has been done on the Utah, which shows a good vein that has yielded already considerable fair grade galena. The Orphan shows considerable work in shafts and tunnels, demonstrating clearly the existence of a strong mother lode; but here the trouble is with surface water, and to overcome this difficulty the company has in the past year concluded to run a tunnel through the quartzite. This tunnel will first tap the Diehl lode at a distance of about 140 ft., and at a depth of 400 to 500 ft. below the Orphan discovery. The tunnel is now 111 ft. long. A shaft in the Anna shows a fine ledge of galena. All in all it is easy to pronounce a prosperous future for the Cariboo Company's mining property.

Great Western, situated in Dry Gulch vein, 1 to 5 ft. wide, containing galena and carbonate of lead, value of the ore \$30 to \$130 per ton. Comet, on Miller Hill, well developed by a tunnel over 200 ft. long, and several shafts, cuts, and adits. Rose Bud, Tidy, Modoc, and Swiftsure, are very promising mines on Silver Glance Hill, with considerable developments on the same. Pittsburg, Hudson, and Pioneer, owned by A. Hanauer and Co. These mines work on bed and contact veins in the limestone, and between the limestone and quartzite; the veins are 3 to 8 ft. wide, containing galena and carbonate of lead, sold at from \$18 to \$30 per ton. Developments consist of tunnels, drifts, inclines, and adits to an aggregate length of over 15,000 ft. War Eagle, A and B, owned by Moses Hirschmann; bed vein in limestone, 3 ft. wide. Character of the ore is the same as in the Pittsburg Mines. Deer Creek Company's Mines, comprising the Happy Boy, Ruthven, Bertie, Governor Murray, and Silver Mines; value of ore \$47 to \$70 per ton. Developed by several tunnels, drifts, shafts, and cuts. Milkmaid, owned by Messrs. Pierce and D. Clift; vein contains galena and carbonate of lead, valued at from \$30 to \$80 per ton. Shipments of ore regular, with fair profits; extensively developed. Wasatch King, owned by J. Chipman; character and value of ore the same as in the Milkmaid; well developed. Elizabeth Boyd Kelsey, owned by the Silver Lake Mining Company, of New York; vein 2 ft. wide, fissure vein between porphyry and granite as foot wall; average value of the ore \$30 to \$80 per ton. Jane, Kate, B. Kelsey, Louisa, and McCall; vein in quartz containing ore, which assays from 60 to 338 oz. of silver per ton. Knight Templar and Royal Arch, owned by A. M. Bredemeyer; vein 6 in. to 5 ft. wide, containing galena, carbonate of lead, and chloride ores, sold at from \$47 to \$130 per ton. Developments consist of a main tunnel 300 ft. long, and several shafts, inclines, drifts, and cuts. Other prominent mines of these districts, more or less developed, with good pay ore in sight, are—The mines of Louis Olover, on Miller Hill, Conquerer, Queen of Sheba, Sultana, Grand View, Fair View, and many others.

The above mines of American Fork and Silver Lake have produced in the past tens of thousands of tons of good high grade ore, and are certainly capable to produce immense quantities more of the best quality. The districts contain the Sultana Smelting Works (three shaft and one reverberatory furnace), 50 charcoal and lime kilns, and five sawmills. The towering mountains are covered with magnificent red and white pine timber, streams of crystal water rush all the year round from the mountains, giving the finest water-power everywhere throughout the districts for any and all purposes connected with and beneficial to mining, and the concentrating and the reduction of ores. The magnificent scenery has justly given to these districts the name of the American Switzerland, and they are certainly

worthy the attention of the capitalist and tourist on account of the great value of their virgin mines, and for the latter on account of the grand, beautiful scenery. American Fork shows unmistakable evidence that it was at remote past ages filled to the very mouth by glaciers. These glaciers can be easily traced by the marks they left all over the districts. It is indisputably a fact that the system of glaciers was coincident with the ancient lake named by the United States geologists Lake Bonneville, of which said lake are left as remnants and visible monuments Great Salt Lake, Utah Lake, and Lake Sevier. The shore marks and lacustrine deposits of said Bonneville Lake occupy the whole of the valley, and just touch the foothills of the great mountain ranges. The moraines and other marks and traces of glacial action are mostly confined to the higher situated gorges and ravines of the Wasatch, Oquirrh, Onoqui or Skull Valley, Cedar and Snake Mountain ranges; but at the mouth of American Fork we have evidence from observation that the moraines extended into the great ancient lake.

W. BREDEMAYER, M.E., U.S. Surveyor.

Salt Lake City, Dec. 5.

NEW GOLD DISCOVERY IN NEW MEXICO.

SIR,—Some details concerning the new gold find here will be of general interest. The Las Vegas Optic states that the sluicing process was given a trial at the bridge over the Gallinas yesterday afternoon. The work was done by the two miners who first made the discovery, and several hundred persons gathered around to be sure that it was a fair test, besides doing all in their power to prevent the men from doing this very thing. The sluice-box is a very unsatisfactory arrangement anyway, but the showing of gold when the "clean up" was made, is claimed by old miners to be entirely satisfactory. The Optic has not evinced much enthusiasm heretofore, nor are we prepared to slop over with the article now. That yesterday's test carries with it a greater amount of encouragement than any previous test, we are happy to admit. Let the men who have the time to spare, proceed at once to organize a "development and mining stock company." It would require but a small amount of capital, say, \$500, to make a final and exhaustive test of the merits of the new discovery. If this test should prove the miners' theory to be right, then we are all right ourselves. It will then need no trumpet's blasts to bring the fact before the world, and we will care very little whether the world knows it or not. Let us get the gold first, it matters not how quietly, and the world will then come to us, without the formula of an invitation. Intelligent, systematic work is needed. The Optic is in favour of giving the men who first made the discovery a helping hand, while we are opposed to anything which shall savor of booms, gush, and useless enthusiasm. Let the moneyed men of Las Vegas call a meeting at the opera-house, in their private office, or on the Gallinas bridge, but at that meeting let them do business. Instead of staking out gold fields in their mind, let them stake out a business way by which a thorough test can be given the matter in hand. If there is gold in the Court-house foundation in Houghton's back yard, or in the hills adjacent to the city, it will remain there unless something besides talk is resorted to.

Messrs. Gilkey and Smith, who are doing the work in the new find at the Court-house, brought their pan of sluice washings to my office to have it assayed. The two men claimed yesterday that the pan would possibly assay pure gold to the amount of 15 or 20 c., and even at this price they could make it pay, provided, of course, that they were furnished the facilities for working. It assayed, not 15, but 42 c. to the ton. Subjoined is my opinion as to the value of the recent find. That there is gold in the gravel upon which the intended county buildings have been located is, I think, established beyond a doubt. Numerous private trials established that fact, and the more elaborate trial made yesterday afternoon, of something like a third of a yard of gravel, by sluicing, proved to a great extent the amount likely to be found in that particular stratum of the deposit. Taking the result as given in my certificate of this date, it would place the value of the gravel at about \$1½ to the cubic yard. The next question to be decided is the depth of the deposit. It will be noticed that a stratum of very tenacious clay lies below the deposit of gravel, which has been operated upon, and the question now to be decided is—Does the gold exist below this clay? This can only be decided by digging down to bed-rock, and until that is done it would scarcely be wise to calculate much on the benefits to be derived from the recent find. The present stratum is not of sufficient thickness to justify very great expectations. In Australia in a great majority of cases there is a somewhat similar stratum of clay, and below that gold is never found. It would be well to ascertain whether the same rule does not apply here. If digging down shows a gravel wash of a date more ancient than the clay deposit, then it is possible—nay, it is probable, that gold will be found down to bed-rock, and, if so, in all probability in greater quantities; and to test this point is a step that should at once be taken, and until that is done my advice is, "Go slow."

Las Vegas, N.M., Dec. 14.

JOHN ROBERTSON,
Mining Engineer and Assayer.

CHONTALES GOLD COMPANY.

SIR,—At the meeting of this company on Dec. 28 explanations were given as regards the mines that are now being worked, illustrated by etchings of the property. Referring to the Consuelo Mine, and the amount of backs available east and west of the rich pillar, it was stated that a former manager, Mr. Belt, who was the last manager that worked this portion of our property, gave it as his opinion that the quartz in the backs west of the rich pillar contained about 6 dwts. to the ton, with the present economy 4 dwts. would pay all costs, and give a dividend profit on the east of the rich pillar. Mr. Belt considered the yield in the backs to be worth 4 dwts. a ton. Our present operations are working Consuelo main level; at present some hard strata has to be dealt with requiring the use of dynamite, for which the manager is waiting the arrival. As a shareholder, to me it seems strange that having driven the main level, and being in close proximity with the backs west of Consuelo having the opportunity of taking out a large amount of payable quartz, that he should have either considered it not desirable or neglected to do after driving the main level and reaching the backs. Had he then commenced crushing his—the monetary—difficulty would have been avoided, and the pneumatic stamps which he disposed of upon his own responsibility for a small sum might have been prevented. It has been stated that pneumatic stamps are not used in Nicaragua to advantage. Mr. Smieddle, formerly manager of Chontales, who now works his own mine at Libertad, a short distance from Chontales, uses pneumatic stamps to advantage, and finds, as manager of his own property, he can make 1 dwt. pay expenses, and Mr. Danby, who was formerly a manager at Chontales, now at Venezuela, and is erecting machinery for the Victoria Gold Mine, has given a preference to pneumatic stamps. Mr. Smieddle made a profit in 10 months of 4247½, averaging 4½ dwts. to the ton from July to April. Mr. White has made a profit of 4597½, averaging 25 dwts. to the ton in 10 months from February to November. Mr. Smieddle accomplished his profits by the quantity of quartz crushed. Mr. White, who has crushed but little more than an equivalent to one month's crushing, by the rich quality of the ore. Mr. White, in his report, states that he has every requisite for working the 24 heads, which would be equal to crushing nearly 2000 tons a month.

The other mine, the San Antonio, now being worked 300 ft., has been driven, and to reach the old workings 600 ft. more would have to be driven, which means about two years, yet it does not follow that we shall have to reach the old workings before payable ore is met with, at the same time there is some uncertainty respecting it, and if we continue driving the Antonio and Consuelo levels without payable ore it would soon affect the capital we have now in hand; it appears that the backs which are available and have payable ore should at once be attacked, and as the dry season is favourable for the continuation of ground containing rich mineral, by that means doubtless we should have our capital increased, and be enabled in due course to continue the San Antonio level.

At the meeting I drew the attention of the directors and shareholders to what appeared to me a necessity in the event of the operation at the mines being extended of the desirability of sending out a mining captain. There is great credit due to Mr. White for

the economy he has brought to bear at the mines. At present the only English staff we have now is Mr. White and his nephew; illness might occur to one or both, but independent of this the opinions of a mining captain would be valuable as how to work the mines and where are most likely portions of the property. I am a strong believer in economy, and also that mistakes are often made by false economy. I have had a correspondence with the directors as to the conciseness of the reports that appear in the Journal, and at the meeting referred to the subject of the conciseness of our reports, in a few lines it is possible to contain *multum in parvo*, but those who read the reports received and furnished from the Chontales Mining Company can know but little after having read the reports.

Bristol, Jan. 2.

W. B. PALMER.

MINERAL RESOURCES OF ICELAND.

SIR,—I send you enclosed news notes on Iceland, which, especially as regards the minerals, may be of some interest to your readers. We have had this year an unusual influx of scientific men, who have pursued various branches of research in the island. Geologists, botanists, and philologists, chiefly from Germany and Sweden, have visited Iceland, and investigated its structure, flora, and language; and at present Professor Sophus Tromholt, well known in scientific circles by his researches respecting the aurora borealis, is pursuing these investigations here, and intends to remain all the winter, as from the clearness of the atmosphere, and the frequency and brilliancy of the aurora borealis, Iceland is excellently suited for his observations.

Reports of a volcanic eruption in the interior of the island were current this year, and seem to have been founded on peculiar appearances of the sky, and especially on the observation from some of the remote inland farms of columns of smoke or vapour rising in the far distance. Nothing definite has been learned as to these phenomena, but the fact that a large part of the interior of the island is occupied by snow-covered mountains and glaciers, sandy wastes, and lava fields, which the natives never penetrate, and which are quite unexplored save by a few enterprising English travellers, such as Mr. W. L. Watts, who crossed the Vatna Jökull, and Mr. W. G. Lock, who explored the crater of Askja, renders it not unlikely that volcanic disturbances may have occurred in the centre of the island without attracting much attention.

There is still much room for geological investigation here; a large part of the island is, scientifically speaking, unexplored, and, in spite of the researches of the late Dr. Hjalptin and the various foreign geologists who have from time to time visited Iceland, its mineral resources are but little known and very partially developed. The sulphur deposits have of late years been in the hands of enterprising Englishmen, and are at present being worked with every prospect of success by an English company. But, besides sulphur, the island contains other valuable minerals, such as Iceland spar, coal, lignite, borax, and copper, none of which are at present worked to any practical extent.

The trade, fisheries, and general condition of Iceland have made satisfactory progress this year. The weather has been favourable, and the hay crop excellent, consequently the farmers are in a fair way to recover from the loss caused by the severe weather and scarcity of hay, which occasioned the grossly exaggerated "famine" outcry last year. The fisheries have been successful, and the fish high in price, and as fish and fish products form nearly two-thirds of the total exports, this has given a considerable impetus to trade, which is rapidly extending, especially between this country and Great Britain. The fisheries—cod, herring, shark, and whale—are capable of great development, and offer a promising field for British enterprise and capital.

Reykjavik, Dec. 17.

W. G. SPENCE PATTERSON,
H. B. M. Consul for Iceland.

SNAEFELL SILVER-LEAD AND BLENDE COMPANY.

SIR,—Permit me to draw the attention of the mining public to the restarting of this company, which has been reconstituted with a capital of 26,000£. It will rival, if not exceed, the celebrated Great Laxey, which has paid nearly the subscribed capital six times over in dividends. It speaks well for the success of the undertaking, the present directors having subscribed nearly one-half of the present capital for reworking the mine. This will be the prize of 1884.

Douglas, Jan. 3.

SCRUTATOR.

FREE TRADE, AND LOW PRICE OF METALS.

SIR,—Though my letter which appeared in the *Mining Journal* of Dec. 15 had not in itself any particular merit, still, as relating to a subject with which the vital interests of Cornwall are inseparably bound up, I expected it would have excited a good deal of notice. I see it had a passing editorial notice, and has now been remarked upon by Mr. Nines, in last week's *Journal*. It is well that Cornishmen should look at their present position, and at the fact that in 1882 there were imported in 11 months—of Straits tin, 7129 tons; of Australian, 4150 tons; whilst in 11 months of 1883 these imports have increased to 9000 and 9035 tons respectively, giving a total increase of 6756 tons. There is no reason to believe that the Straits imports will slacken, whilst the Australian must largely increase until they have so run down the market that not a mine in Cornwall—save, perhaps, West Kitty and East Pool—will be able to carry on at all. A drop of 6½ or 7½ per ton below the recent figures of 82½ will render Dolcoath profitless. The large deep mines, at present with heavy debt balances, will be wiped out, or only kept on by means of enormous calls.

There is a Spanish tin mining company now forming, and should it be what it is represented, its workings alone may swamp the whole of the Cornish tin industry.

Spanish lead has ruined British lead mines, and Spanish tin may prove equally fatal to home tin mining. There is no hope of escape for Cornish interests save by obtaining just protection against these foreign imports, which are morally wrong, and cannot, therefore, be politically right. It is morally wrong that a whole English county should be impoverished and its best men exiled that a trivial benefit may be conferred upon the nation at large by cheapening its tin, copper, and lead.

Were tin 120£, copper 100£, and lead 20£ per ton, the population of England would only be almost imperceptibly affected adversely, whereas the county of Cornwall would become an area of thriving industry and prosperity. Cobdenites, whenever Protection is named, raise their parrot cry of "impossible." Nothing is impossible in a just and good cause. Cornishmen by union will get Sunday closing. A few years ago that was "impossible." Local Option is "impossible," but Local Option will be gained ere long. Why should not all Cornishmen unite to obtain this other impossibility of Protection?

The present injustice is so glaring, and so iniquitous, that united appeals would have to be listened to, and in the end success would attend the petitioners. Anyhow this is the last plank which Cornishmen have to trust to. It is a dream to suppose that any profitable rise can take place in tin, copper, or lead, the production of which is rapidly increasing except in Cornwall, where these industries are withering up under the baneful curse laid upon that county by the Cobdenites, and their anile craze. With incredible assurance they point to the grand position of our nation, and claim for their noxious idea the credit for it all. Yet America and France, under strict Protection, have advanced as rapidly, and indeed more so. Mr. Bright proclaims that Protection means ruin to a nation. Are France and America ruined? Mr. Bright, in his old years, has become a kind of dry nurse to the afflicted publicans. He wants to prolong their precious traffic for at least ten years more! Mr. Bright's ideas are obsolete, used up, effete. He is behind the age. Because he helped to repeal the unjust Corn Laws he dreams that he alone is wise. All Protectionists are, he says, fools and lunatics—*ergo* Americans and Frenchmen are fools and lunatics. Poor fellows!—But they "get along somehow," whilst we wiscars are tumbling from one trouble to another under the ridiculous system called Free Trade, which means essentially feeding foreigners with the food which of right belongs to our British workmen.

There are unlimited fields of tin in Australia, and their produce will be sent in wholesale to England till every tin mine in Cornwall is starved out and shut up. On Feb. 3, 1882, foreign tin was 112½.

per ton. Some few days ago it was 82½, and still at a good paying price for the Dutch and Australians. The latter will in a year or two be able to deliver pig-iron in London duty free for 50½ per ton. Therefore, foreigners have been getting 30½ to 40½ per ton profit, whilst the tin mines in Cornwall are struggling with heavy losses and hopeless prospects, save to a select few, about three in number, and even these must be crushed as the flood of the Australian imports augments and cheapens. There will, of course, be fluctuations. Tin is now 86½, and may go higher, but like an expiring lamp the flame merely leaps up now and again ere it becomes finally extinguished.—Jan. 1.

RECIPROCITY.

FAIR TRADE.

SIR.—It being an absolute fact that not a single nation on the face of the earth had adopted Free Trade with the exception of Great Britain, and that still more stringent tariffs are being imposed, the question naturally arises how much longer this anomalous and ruinous state of affairs is to continue? It is very questionable if the Bill would have ever passed through Parliament, but from the confidently expressed opinion of the leaders of the movement in the cities that on England becoming a Free Trade nation other nations would willingly follow the example. The moment anyone interested in the commerce of his country ventures to express regret with regard to the serious consequences of the present one-sided system of Free Trade, and to suggest a mode of fair and equitable dealing between nation and nation, he is met by the assertion that the increased commerce of England is mainly if not entirely to be attributed to Free Trade.

The real fact, however, is that so far from this being the case, it is undeniable that the commerce of other nations under Protection has increased at a greater rate than that of England with Free Trade; but with land going out of cultivation almost within sight of the Metropolis, large manufactories in different branches of commerce closed, and mining fearfully crippled this blindness of the national vision still continues. If no other Members of Parliament can be brought to realise the fatal consequences that must inevitably ensue from this great political error, the members representing Wales and Cornwall will not surely stand aloof and witness the crushing effect of foreign competition, owing to fatuous one-sided Free Trade, without an effort to release mining from the consequences of this lamentable national misfortune.

ARGUS.

Tavistock, Jan. 1.

QUICKSILVER IN EXETER.

SIR.—I have lived close to the Bonhay road 16 years. Quicksilver, in its metallic state, was discovered about six years ago by some boys who, at first, threw a good deal of it on the adjoining turnpike road, but when they found out its value sold it to various druggists for 1s. 6d. per ounce. The marsh on the other side of the river belongs to Col. Sir Redvers Buller, who is a popular landlord, and would doubtless allow a few trial pits to be sunk, or grant a concession on liberal terms. Although many geologists have hinted that the quicksilver was thrown into the river my decided opinion is that it will be found in the dark stratum, as many persons have frequently dug it out; and the other day a gentleman called at my shop, where he smelted a small portion at once which I dug out myself, and which proved by assay to contain this precious metal; and he also took another portion with him for a further trial.

W. WOODFORD.

Exeter, Jan. 4.

COMPARATIVE RETURNS OF COPPER ORES SOLD IN 1882 AND 1883.

SIR.—In compiling my usual summary and annual review of the total quantity of copper ores sold from the mines in Cornwall and Devon during the past year, when compared with the preceding one, I find it presents no improvement on the returns, although the decrease is not attributable to a general falling off; whilst some of the mines show a considerable reduction on their returns others have increased, the average produce of the ores being precisely the same, so that the quality of the ores has shown no deterioration in value. The decrease has been mostly from Devon Consols, Gawton United, Marke Valley, and South Caradon Mines, whilst Bedford United, Holmbush, Gunnislake, and Levant give an advance on their annual returns.

The total quantity of ores sold during the year 1882 amounted to 42,118 tons, at an average produce of 6½ per cent.; standard, 107½ 7s.; price per ton, 31. 16s.; fine copper, 2049 tons 16 cwt.; total amount of ore money realised 136,241 7s.; whereas the past year shows the total quantity of ores sold, 39,375 tons; average produce, 6½ per cent.; standard, 97½; price per ton, 31. 6s.; fine copper, 2298 tons 6 cwt.; amount of ore money, 126,067 18s. 6d.; showing a diminution on the returns of 2743 tons of ores, with a reduction of 7½ 7s. on the standard, equal to 10s. per ton on the ores, with a corresponding produce, leaving a deficiency of 10,173 8s. 6d. The year preceding compared more favourably in advance than for several years previous.

I annex a list of 24 copper mines having sold over 100 tons of ore during the past year, showing the increase and decrease on the total returns for the two years; there are 23 other smaller mines having sold ores below 100 tons, which are not included in this list, making an aggregate of 1137 tons, but are accounted for in the annual returns:—

Mines.	1882.	1883.	Increase.	Decrease.
Bedford United.....	916	1,496	580	—
Calstock Consols	36	110	74	—
Devon Consols	11,499	10,633	—	866
East Caradon.....	263	274	71	—
East Uney	128	157	29	—
Emily Mine	nil.	196	196	—
Gawton United	1,021	545	—	476
Glasgow Caradon	920	915	—	5
Gunnislake	2,399	2,668	267	—
Holmbush	492	1,316	824	—
Levant.....	1,117	1,413	296	—
Marke Valley.....	2,120	1,626	—	494
Mellancor	6,697	6,748	51	—
New Cook's Kitchen...	469	349	—	120
Prince of Wales.....	349	428	79	—
South Caradon	5,040	2,802	—	2,238
South Devon United...	1,890	1,510	—	380
Violet Seton	247	150	—	97
West Caradon	281	370	89	—
West Seton	360	378	18	—
West Tolgus	1,022	953	—	69
Wheal Arthur	nil.	289	289	—
Wheal Jewell.....	618	350	—	268

M. W. BAWDEN.

Mining and Assaying Offices, Liskeard, Dec. 31.

TAVISTOCK DISTRICT—THE DEER PARK MINE.

SIR.—I am pleased to be able to state that this property is again under grant. The sett is very extensive, being 600 fms. from east to west and 500 fms. from north to south; and as six known lodes pass through the sett it is considered by the miners of the district to be a property of no ordinary promise. It was worked some few years since to a limited extent, and two of the lodes only opened up, which contained tin and copper. In addition to the number of lodes mentioned above there are two cross-courses. The sett adjoins the River Tamar, and as the hill rises fast, they can get from 80 to 100 fathoms back by means of adit levels. The late party drove an adit level from the river on the south lode, and sunk an engine-shaft 58 fms., that went through the adit 40 fms. deep.

There are two large streams of water, one on the east and the other on the west of the sett, available for dressing the ore. Another very important feature is a station on the Minerals Railway within 1 mile of the centre of the sett, thus ensuring inexpensive carriage of ore to market and materials back for working requirements. The geological conditions are similar in character with Devon Great Consols and New Consols. The strata is clay-slate, adjoining the granite range of Kit Hill.

The lode at Trebartha Lemanne, in the 10 fm. level, mentioned in

last week's Journal, is further improved, its worth being 50½ per fathom for tin.—Callington, Jan. 2.

JOHN BUCKINGHAM.

SHROPSHIRE LEAD MINES.

SIR.—Some time ago your correspondent for Salop, North Wales, and Cardigan said stagnation was the best term to apply to lead mines here and North Wales. From this and other remarks we are inclined to think he is not so well acquainted with the mines here as a correspondent ought to be. Whatever may happen in the future if the low price for lead continues, the term he uses does not apply to our mines, nor has it been applicable to them for a good many years past, for we have about the same number of miners at work in the district as we have had, as we say, for some years; in fact, ever since Mr. P. Watson and his friends have turned their attention to the district, and taken in hand the Roman Gravels, Tankerville, &c., and if lead ore was at (say) from 10½ to 12½ per ton these mines would all be paying good profits. Tankerville Great Consols shareholders, one and all, will do well to strengthen the directors' hands, and assist them to complete the opening out of the mines. The very considerable returns they are now making indicate what they could do if the mines were once put into the most advantageous form for a large output. We mean with shafts down, levels driven, and good reserves laid open for stopping. Snailbeach Company have reduced their hands, and we wonder how they can expect the mines to pay if they stop the ore getters. A few pounds rise in lead would make this a happy new year to many of us.

MINER.

HARBOURS OF REFUGE, AND SHELTERED ANCHORAGES.

The soundness of the principle of employing two similar and opposing forces to neutralise each other in order to bring about a state of rest between them was referred to in the *Mining Journal* a few weeks since as one of the great recommendations of the Greenway Breakwater; and at the recent *conversations* of the London Literary and Artistic Society the inventor—Mr. E. GREENWAY-THOMAS—delivered an address which cannot fail to make the economy and utility of his invention more widely appreciated. Although scarcely coming within the scope of the objects of the society the saving of life at sea by the provision of cheap and reliable harbours of refuge is a matter of such paramount importance that it may properly be discussed anywhere. The necessity of affording increased protection to our great fleet of colliers has constantly been urged upon the notice of the readers of the *Mining Journal* for the last 40 years, the late Mr. James Mather and other correspondents having pleaded the cause of the workers of the coal fleet with much eloquence, yet much still remains to be done to give them the protection demanded, and which the Greenway Breakwater seems competent to give. In the address in question Mr. Greenway-Thomas said: This being an artistic society there cannot but be many present who are lovers of Nature. True art gathers all her inspirations from the works of God around her. All art and science is based upon a study of the works of the great Creator. It is in this study of and contest with the grand forces amid which he dwells that man's intellect is developed. Among those forces one of the most sublime and majestic is the ocean. The almost irresistible power of water in movement—as in the flow of a river, the Falls of Niagara, or Girsappa in South India, or the ocean in a storm—are well known. The devastation caused by a single wave has often been appalling. The great wave of Iquique, and of Masulipatam, in the Bay of Bengal, some 16 years since, destroyed towns containing 20,000 or more inhabitants. The giant wave which passed up the Hooghly, I think in 1863, destroyed over 100,000 people, submerged large tracts of land, villages, and crops, besides doing a fearful amount of damage to shipping. To come nearer home—at Jersey and Alderney, in the Channel Islands; at Wick, in the North of Scotland; at several ports in the Isle of Man, and many places on the West Coast of Ireland, it has been found impossible to cope with the force of the sea and construct works which shall successfully oppose its power.

It is, however, man's birthright and his duty to continue the contest. He has been bid to replenish and subdue the earth. He has to learn the road to victory through defeat. Shelter for our shipping in time of storm is a necessity without which a mercantile marine cannot exist. This wreck chart shows the disasters that have occurred on nearly every mile of our coast. The loss of 1000 lives and 2,000,000 7s. of property annually is surely enough to make us feel that whatever the difficulties some means of averting this loss must be adopted. It is not a little remarkable that though there have been several committees and numerous reports, and the question of harbours of refuge has been constantly before the public, there may be said, with perhaps, the partial exception of Holyhead, to be not one such artificial harbour. The Downs—a natural refuge harbour of great extent, in the very course of a large trade—may be said to be the only one we have. The reason for this remarkable fact is worth the careful attention of the nation. It is simply a question of expense. The present structures do not meet the national requirements. For purposes of war, or for the starting and arrival of a line of mail steamers, this wealthy nation can find the means of making a port, but for the simple saving of life and property we cannot afford the vast sums required by the present method of constructing harbours of such a depth as to be available for vessels at all times of the tide. The present solid structures of stone or concrete are not built anywhere in a depth suitable for large vessels at a cost of less than 1,000,000 7s. a mile. There has recently been a lengthened and eager discussion as to the favoured spot at which, for 20 years to come, our convicts are to be located deliberately constructing one of these ports; yet, who can look at that wreck chart, copied from that issued by the Lifeboat Association, without feeling that the fishing and coasting trade on our stormy shores should have a refuge to run to every 50 miles. It is an old saying that necessity is the mother of invention, and it surely behoves us as a nation to spare no pains till some road out of the difficulty is discovered. No reasonable man can doubt that if some such provision could be made, both the fishing and the coasting trade would at once increase enormously. The bone and sinew of the nation—those who are necessary to our existence and independence, our sailors—would be more numerous, and we should be spared the annual cry from bereft orphans and widows.

I now invite kindly consideration of an invention, or rather an application of well-known facts, based simply on the observations made (extending over a series of years) by a lover of Nature. In considering the force that we have to contend with in the ocean, we have to say to begin with, that that force is what we term a wave. That undulation in the water that is caused by the impact of an external force, usually the wind. The action of wind produces a ripple, and causes that ripple to travel with ever-gathering size and speed, till, with the momentum of 24 hours of a gale stored in its advancing form, it falls with terrific power upon anything that opposes its progress. We may here observe and take heart from two facts. The power of a wave is limited both in force and in depth. In force, because a wave does not travel by an irrestrainable law of Nature like that of the flow of water till it reaches its level, or the rush of air to fill a vacuum. The moving form, which we call a wave, is simply the stored momentum of a certain amount of wind power. As in the case of a train in motion, this mysterious invisible momentum amounts, it is true, to no despicable force, but still it has its limits. A flowing river will pass round or overtop all obstructions and make good its course. The law by which it is impelled is irresistible and unlimited; but with momentum it is different. A limited amount of force has to be expended, and it ceases to exist. The depth of a wave is also limited. Except when within a few feet of the shore, it does not extend from the surface to the solid ground beneath. It is a surface movement. The natural condition of water is rest, and even when the surface is disturbed by an external force—the wind, the lower portions of water successfully resist the effects of the surface movement. It is an ascertained fact that in depths of 40 or 50 ft. in which vessels are likely to anchor, the water is not appreciably disturbed below 15 or 20 ft. We thus learn that it is only the momentum contained in this 15 or 20 ft. of water that we have to deal with.

We have next to consider the natural qualities of the force we

have to oppose. It is incompressible and cohesive. That powerful and ingenious instrument, the Bramah press, is based upon the fact of the incompressibility of water, and the perfect way in which a force applied to one portion of a confined space of that fluid is instantly communicated in undiminished strength to the other extremities of the same space. The continuous action of a syphon depends upon the cohesion between the particles, the water when once in motion acting like a rope, and drawing particle after particle with it. Though incompressible, a fluid easily gives place, and retires when unconfined before any intrusive force. These simple laws are exhibited to us when we see the inability of solid structures to resist for any length of time the direct blow delivered by this compact and almost solid mass when in movement, and the ease with which a boy may propel a skiff between its displaced particles. It is the difference between diverting and opposing water. In dealing with the banks of rivers it is found that a very slight groin on one side will cause erosion on the opposite bank a mile distant. The rudder of a boat or a ship is another instance of the immense advantage that lies in diverting and not opposing water. The slight oblique angle at which a rudder is held by a child's hand will direct a vessel through the yielding element. The marvellous power that lies in a rudder requires a little thought to be fully appreciated. "Behold also the ships which, though they be so great, and are driven of fierce winds, yet are they turned about with a very small helm withersoever the Governor listeth." A rudder of a large mail steamer is seldom a 100 square ft. yet if we take that vessel to have a displacement of 500 ft. in length by 20 in width and 20 in depth, all within the mark, we have here 200,000 cubic ft. of water displaced by the action of the rudder every time the vessel moves laterally its own width. Even the action of the screw is again the application of an oblique or diverting force.

The yielding nature and the incompressibility of water render it a powerful friend or a terrible enemy. The Greenway breakwater turns this great power to account, and uses it as an ally. The passage in Holy Writ concerning St. Paul's shipwreck contains the following words—"They fell upon a place where two seas met, and they ran the ship aground." That is to say, where the opposing currents spent their force on each other the mariners deemed the best spot for them to attempt a landing, which the unchecked force of either wave would elsewhere have rendered dangerous to life. In this and in other instances under daily observation we know how easily and perfectly counter currents control, divert, and rob each other of power.

The object we seek to attain is a harbour of refuge. What is a harbour of refuge? A harbour of refuge should be merely a safe anchorage at all times of the tide. It needs to be in not less than about 40 ft. of water. The moving surface to a depth of 20 ft. has to be so far moderated that vessels can ride at their anchors or moorings in safety. It should be extensive enough to protect all the vessels that are likely to seek its shelter. It should be as nearly as possible on the usual course of those for whose assistance it is laid down, and it should be independent of the contour of the coast in their neighbourhood. These are the simple and requisite qualifications of the harbours of refuge or sheltered anchorages that we require, like cities of refuge, every 50 miles round the coast of Britain. For this to be attainable they must be inexpensive, out of all proportion to anything now used. The Greenway Breakwater is constructed on the natural principles referred to above, and is an attempt to meet the requirements just named. The main principle of it is that instead of opposing an advancing wave, and being a breakwater at all, it is more correctly a turnwater, diverting the waves and compelling them to spend their force on one another. It consists of a line of buoys or pontoons, each of the size of an ordinary fishing smack, but triangular in form. Each buoy is anchored separately, so as to retain its prow or point always towards the advancing wave. Each advancing wave is cleft in twain by the sharp point presented, and the portions thus cleft are carried along the concave sides, and turned *volens volens* upon each other. In the conflict between the counter currents momentum is expended, and the shoreward movement of the wave is broken up, and checked. The buoys being 10 ft. deep in the water, and water, from its cohesion of particles, always greatly affecting the contiguous portions, the portion of the water that is thus affected will be at least 15 ft. in depth.

It is not the surface, therefore, but 15 ft. of water that is thus diverted and checked. Because these buoys have concave bows, and not convex—they can never receive that sudden blow from a wave that parts ships from their anchors, but, in its place, a gradual strain. To meet this it is only necessary to make anchors heavy enough, and cables and attachments strong enough. I propose to give to each of these buoys an anchor and cable at each corner of the strength usually assigned for a vessel of 100 tons—that is, ten times their size, and thus I make 30 times the usual provision to prevent their breaking away. The anchor is of peculiar construction, the weight of it can be doubled at will, it will not drag, and, once down, it is almost irremovable. Anchor and cable will be so coated as to prevent corrosion, and so attached to one another by splice or elastic joint as to prevent movement and friction. There is nothing, therefore, to prevent all the parts from lasting many years. For ready access to, and examination and repairs of, these submarine portions of the breakwater, the Flenas apparatus affords a simple and inexpensive means. By the use of this apparatus a diver is rendered independent of boat and air-pump, and can spend several hours under water at one time safely; and thus the moorings can be easily overhauled periodically at a minimum cost.

That the lecturer stated enough to prove that the system is worthy of being thoroughly tested cannot be doubted, and as a complete test would only involve an outlay of 5000 7s. or 10,000 7s., there ought to be no difficulty in finding the necessary funds. Were the trial made at such a place as Hastings, for example, every facility would be afforded for London capitalists to see it in action, and, when satisfied with its success, the funds would readily be forthcoming to provide similar protection all round the coast. Among the claims made for the Greenway Breakwater are—that it will make an anchorage or harbour of refuge in deep and rough water where solid works could not be constructed; the small cost at which it would provide harbours of refuge—half a mile of breakwater—100 acres of 7 fm. anchorage, every 50 miles of the coast, for 10,000 7s. each; these small harbours, or even smaller for 5000 7s., at the mouths of rivers, would be invaluable to fishing-smacks and coasters on the East Coast and in Ireland; each such refuge harbour might be completed in six months; it is economical, because it affects only the part that needs to be affected—the upper 20 ft. of water; it is different from all other floating breakwaters past or present, in that it uses the force of the sea to quell the sea—it diverts, not opposes; it is elastic in its moorings, and oblique or evasive in its form, and thus avoids the destructive force of the sea; it is in small portions, and the moorings can therefore be easily made strong enough. The breakwater has altogether much to recommend it.

THE PULSOMETER.—The extreme simplicity and durability of the pulsometer has led to its more extended application each year since its first introduction, and it is now generally recognised that it can be effectively and conveniently used in many cases where no other form of water elevator would be admissible. The approach to perfection has been nearer and nearer in proportion to the experience gained, and the apparatus being now made in various sizes and with different forms of valves to suit the precise purpose to which it is to be applied, the company—the Pulsometer Engineering Company, of the Nine Elms Ironworks—have found it necessary to issue a new illustrated catalogue, and have taken the opportunity to include price-lists of the pulsometer, centrifugal pumps, pumps in general, engines and boilers, and general machinery. For those who are not yet familiar with the pulsometer, it may be interesting to state that it consists of a single casting or body composed of two chambers side by side with tapering necks bent towards each other and terminating in a neck common to both, and forming the steam chamber, wherein a ball valve is fitted, so as to oscillate between seats formed in the junction. Downwards the chambers are connected with the suction passage, wherein the inlet or suction valves are arranged, and there is a discharge common to both chambers;

and provided with one or two valves, according to the purpose for which the pump is to be employed. The pump being filled with water, is ready for work. The steam being admitted through the steam-pipe into the steam chamber passes down the neck and into one or other of the chambers, according to the position of the steam ball valve, the said steam pressing directly on the surface of the water in the chamber which is exposed to it, depressing it without any agitation, and consequently with but very little condensation, and driving it through the discharge opening and valve into the rising main. When the water is forced down to the level of the discharge orifice a puff of steam reaching the discharge pipe is instantly condensed, producing a partial vacuum, which pulls over the steam ball valve which is held in its new position by the steam in the supply chamber. The vacuum in the emptied chamber is speedily completed, and the chamber is refilled with water from the suction valve. The instant the steam ball valve has assumed its new position the same results happen in the other chamber, and so on alternately as long as steam is supplied. The volume of water raised by the consumption of a given volume and pressure of steam is surprising, the uninitiated not unnaturally supposing that there will be a loss which does not occur in practice from the steam being in direct contact with the surface of the cold water. The catalogue should be read by everyone before deciding upon the pump which they will employ.

THE GEOLOGY OF THE COMSTOCK LODE.

BY GEORGE F. BECKER.

The geology of the Comstock lode and the surrounding region was examined by me in 1880-81, and after a long delay in the Government Printing Office, the resulting report is now ready for issue, but at a price which forbids its general distribution. The subjoined brief statement of the principal results reached will serve, however, to indicate the nature of the report, and to many will convey as much information as is desired. The economical importance of the Comstock lode appears from the fact that in the 21 years ending June 30, 1880, a little over \$306,000,000 worth of bullion has been extracted from it. Of this about \$132,000,000 worth was gold. The mines are the deepest in America, reaching a distance of over 3000 ft. from the surface, and they contain about 185 miles of galleries.

Besides the scientific importance attaching to the occurrence of the immense accumulation of ore, the lode and district present other features of great interest. The nature of the rocks associated with the ore, some points of structure, and even the character of the deposit, have received different explanations at the hands of different observers. A digest of the memoirs of Messrs. von Richthofen, King, Zirkel, and Church forms one chapter of the volume. The subject of rock decomposition has received special attention in the examination described in this report. This study has led to some lithological and mineralogical observations of interest, and to the identification of all the Washoe rocks with well-established rock species. The greater part of the hanging-wall of the lode is diabase; the "black dike" is also a variety of diabase, and the supposed trachyte of the district is a hornblende-andesite. The so-called propylite of Washoe comprises a number of tertiary and pre-tertiary rocks, reduced to a nearly uniform appearance by decomposition.

The erroneous determination of these altered rocks as an independent species arose mainly from a confusion between green and fibrous hornblende and chlorite. The supposed propylites from the other districts in the United States, microscopical determinations of which have been published, were also examined and found to afford no sufficient evidence of an independent rock species. A discussion of faulting leads to an explanation of the similarity of the shape of the west wall of the lode and the form of the adjoining face of the Virginia range. The ravines of the latter are a direct result of faulting, and are only slightly modified by erosion. A cross-section of the country on the Suto Tunnel line shows that the surface forms a logarithmic curve in accordance with the theory, which is further supported by experiments. The sheeted structure of the country seems to be referable to faulting and not to eruptive bedding. The theory leads to rules applicable in prospecting disturbed but not greatly eroded districts. The details of the topography of grassy hills are chiefly due to landslips, which come under the law of faults in a modified form, and the characteristic curves of smooth hillslopes are logarithmic.

The order of succession of rocks in the Washoe district is—granite, metamorphics, granular diorite, porphyritic diorite, metamorphic diorite, quartz-porphyr, earlier, diabase, later diabase, earlier hornblende-andesite, augite-andesite, later hornblende-andesite, and basalt. Hornblende-andesite thus followed as well as preceded augite-andesite. Chemical evidence is offered to show that the pyrite of the region is a result of the action of soluble sulphides on the ferro-magnesian silicates of the rocks. Chlorite is held to be a product of the decomposition of hornblende, augite, or mica, while epidote forms at the expense of chlorite under certain conditions, but never from felspar. There is extremely little kaolinisation at Washoe, the felspars having yielded to another kind of decomposition. The diabase of the hanging-wall when fresh was argilliferous and auriferous, and the precious metals of the lode are traced to this rock with much probability, the lateral-secretion theory being thus affirmed. It is further supported by the dependence of the other ore bodies of the district on the character of the inclosing rock.

The hypothesis that the heat of the lode is due to the kaolinisation of felspar is not confirmed either by theory or experiment. On the other hand, there is much geological evidence pointing to a deep-seated source of heat, probably of volcanic origin. This conclusion is confirmed by extensive temperature observations from which it appears that from the surface downwards the increase of heat is uniform, about 1° F. for every 33 ft., while in a horizontal direction the heat decreases in a geometrical ratio to the distance from the lode. Experiments on the kaolinisation of felspathic rock, conducted at the boiling point of water and extending over a number of weeks, show that no heating effect due to this cause could be detected with an apparatus delicate enough to register a change of temperature of 0° 001 C. All the important and profitable ore bodies of the Comstock, it appears, have occurred at or close to the west face of the earlier diabase; and is near that surface, and there only, that exploration is at all likely to be successful.

The mode of occurrence of bonanzas is considered, and hopeful prognostications are made for at least two portions of the lode; but a series of bonanzas nearly on the same level, such as was found on the east vein near the surface, is not likely to recur. Electrical surveys were made both on the Comstock and at Eureka. At Virginia only negative results were obtained. At Eureka a distinct though small difference of potential occurs near ore bodies, and with sufficiently delicate apparatus the method might there be used for prospecting. It is believed that sulphuret ores would have given results of a more convenient magnitude than the carbonate ores of Eureka.

THE NEW PATENT LAW.—The Inventors' Patent Right Association has issued a circular to inventors, in which it is stated that the new law, which came into force on Jan. 1, will cause some considerable alterations in the mode of procedure for obtaining patents. The advantages, as compared with the old law, which it will confer upon patentees are very important, and they may be briefly summarised as follows:—1. An official examination of specifications, and an opportunity of their amendment during application. This will necessitate much greater care in the preparation of the specification to guard against objections from the examiners, and consequent delays.—2. Extension of the time for provisional protection from six to nine months.—3. Extension of the first term of the patent from three to four years.—4. A very considerable reduction in the amount of the Government fees for the first four years.—5. The alternative of paying the subsequent fees of 50*l.* and 100*l.* (which remain the same) in yearly instalments instead of in lump sums. Under the new law a patent may be procured either—Firstly, by applying for provisional protection, and filing with the application a provisional specification, and then at the end of about nine months completing the patent by filing a final specification; or, secondly, by

filing a complete specification in the first instance. The first of these modes is strongly recommended in preference to the other, as it allows time for maturing the invention, and enables foreign patents to be taken out before its publication, which could not be done under the second mode.

FOREIGN MINING AND METALLURGY.

There has been no important change in the general tone of the Belgian Coal Trade. A spell of really cold weather is required to stimulate the household coal trade, and the winter is now so far advanced that even if cold weather should set in it is not likely to be of long duration. The demand on the part of the ironworks has fallen off rather considerably; but notwithstanding this the price of the best industrial coal has remained nominally unchanged. In the Coubant de Mons prices have remained firm, and satisfactory deliveries may be said to have been made, having regard to the general condition of business; the demand for coal for industrial purposes has, however, shown some depression. In the Liège basin the coal trade has been rather better supported than in the Charleroi and Centre districts. Coke has been selling at 12*s.* per ton, but rumours are current of a probable reduction from this price; steps are being taken for a restriction of the production. The winter has occasioned a pretty good demand for household coal in Germany, but the demand for industrial coal has declined rather materially; the demand on export account has increased, and this has averted the depression which would otherwise have prevailed. The cost of production has been reduced, and this reduction is expected to assist colliery proprietors in meeting the difficulties of the moment. The deliveries of coal upon the lines accommodating the basin of the Ruhr still exhibit considerable importance. In the first half of December these deliveries amounted to 84,050 tons, as compared with 79,870 tons in the corresponding period of 1882. The deliveries of German coal to Italy have rather fallen off of late.

The Belgian Iron Trade continues to exhibit a good deal of depression. It cannot be denied that orders have become very scarce, and that industrialists often seek in vain to procure work. Employment cannot be said to be completely exhausted at present; but as orders run out they are not renewed at all freely, and it is difficult to indicate the extent of the sacrifices which some works would be prepared to make in order to obtain a good firm "serious" contract. At the same time, the managers of some establishments, which are still relatively well employed, show little or no disposition to make reductions from the rates hitherto current. Taking, however, a general view of matters, we must state that prices are greatly depressed, and that they show a marked downward tendency. English pig has been selling upon the Belgian markets at about 2*l.* 2*s.* 6*d.* per ton. The Charleroi quotation for pig has been maintained with difficulty at 2*l.* 6*s.* per ton; while in the Luxembourg prices have declined to 2*l.* 4*s.* per ton. As regards refining pig, it would, of course, be difficult to go lower than 1*l.* 16*s.* per ton for mixed pig; but concessions would certainly be made as regards other qualities, and hard pig would be disposed of without hesitation at 2*l.* 2*s.* per ton, while ordinary pig would not exceed 1*l.* 18*s.* per ton. Iron has been weak in Belgium at 5*l.* per ton; in the case of any "serious" transaction 4*l.* 16*s.* per ton would be accepted, and the general average is about 4*l.* 18*s.* per ton. The difference per number per ton has been reduced to 6*s.* per ton, so that No. 2 may be quoted at 5*l.* 4*s.*, and No. 3 at 5*l.* 10*s.* per ton. Plates have been in no great demand. Plates of commerce have made 9*l.* per ton. The Athus Steelworks are now completed.

The condition of the French iron trade is very discouraging, especially at Paris. Business in the Nord is still, however, pretty well maintained, and in the Longwy basin deliveries of pig are more important than they had been expected to be a few weeks since. At Paris, on the other hand, the supply has been greatly in excess of the

demand; at the same time, it is only fair to remark that this is the dead season of the year. The imports of iron minerals into France in the first 11 months of last year amounted to 1,451,850 tons, as compared with 1,264,703 tons in the corresponding period of 1882. The exports of iron minerals from France in the first 11 months of last year were 94,960 tons, as compared with 108,800 tons in the corresponding period of 1882. The German iron trade remains in a difficult condition; the demand is much reduced, especially for pig and iron, while plates, although less neglected, are far from being in active request. The exports of rough pig from Germany in the first 10 months of last year amounted to 209,933 tons; those of rails to 148,690 tons; those of fish-plates, iron sleepers, &c., to 15,385 tons; those of plates to 44,139 tons; those of wire to 171,653 tons; those of worked pig to 50,431 tons; and those of worked iron to 5675 tons. Important orders for railway plant have been given out in Germany of late. The contracts let for the State lines alone comprise 1780 carriages and trucks, and 100 locomotives, of which 81 are passenger engines and 19 goods engines. The German steelworks are generally well employed; only a few of them, indeed, are in a position to undertake orders on foreign account.

STOCK EXCHANGE YEAR BOOK.—The new edition—that of 1884—of Mr. SKINNER'S very useful volume has just been issued, through Cassell and Company (Limited), and has been again extended by the insertion of another 500 additional notices; indeed the title is now scarcely correct, for the volume includes the names and particulars of many concerns which are not quoted on any Stock Exchange in the country. The completeness of the information which Mr. Skinner furnishes has already been referred to in the *Mining Journal*, so that it will suffice to state that the corrections appear to have been brought down to the latest possible date. The system now adopted of keeping in companies in liquidation for one year so as to put the liquidator's name and address on record adds greatly to the value of the book as a work of reference. He points out that during the year public companies have shown anything but a healthy growth. In passing for the Press the now very long list of notices which make up the book, a strong impression has, he says, been gathered that never before have the failures been so numerous or so widespread; and that to the series of losses thus shown to have been inflicted upon investors is due the extraordinary apathy which has prevailed for months past. Those connected with the Stock Exchange have of late appeared puzzled to understand this indifference side by side with exceptional abundance and cheapness in the money market. To us the reason seems clear enough. We have of late heard much about amended bankruptcy processes; and it seems worth considering whether it would not be well to put the liquidation of companies under some sort of commission, with powers to work back to the founders when the circumstances indicated fraud or imposition. Shareholders, as a body, are scarcely capable of effective action, and yet it is desirable that action should be taken. The extent to which companies are registered, as compared with those known to be in business after a reasonable interval is obviously not a true record of the mortality which takes place, because of the number of companies which never get beyond registration; but it is at least some indication of the recklessness which prevails. In the period 1862-82 the companies registered numbered 19,833, while those on the register at the end of 1882 were only 8838, showing a mortality of about 55*l.* per cent. The capital is not easily compared. The 19,833 registered took powers to issue 2,404,042,997*l.*, while of the surviving companies only the paid-up capital is given, and that was 467,248,074*l.* Roughly speaking, only half the companies which are registered have had a good duration of life, and it is probable that of the other half a large proportion ought never to have been attempted. Probably they would not have been but for the financial pests, who literally swarm in a centre so worth the cropping as this is.

DYNAMIT-ACTIEN-GESELLSCHAFT

VORMALS ALFRED NOBEL & CO., HAMBURG.

(HAMBURG DYNAMITE COMPANY, LIMITED),

Formerly ALFRED NOBEL & CO.

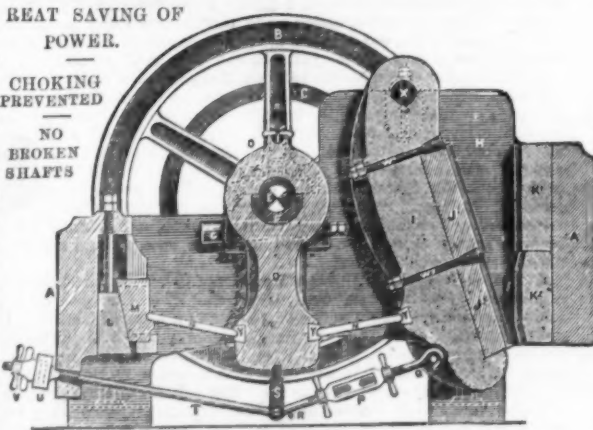
LONDON OFFICE: 42, BASINGHALL STREET, E.C.

BEST PRICES AND TERMS ON APPLICATION.

ROBERT BROADBENT & SON, STALYBRIDGE,

BEAT SAVING OF
POWER.

CHOKING
PREVENTED
—
NO
BROKEN
SHAFTS



PATENTEES AND SOLE MAKERS
OF THEIR WELL-KNOWN

**Patent Improved
Blake Stonebreakers
and Ore Crushers,**
With PATENT DRAW-BACK MOTION,
WHICH DISPENSES WITH ALL SPRINGS.
JAWS adaptable either for CUBING or CRUSHING.
Reversible in Four Sections, with Surfaced Backs.
Steel Toggle Cushions.

PRICES, PARTICULARS, AND TESTIMONIALS ON
APPLICATION.

THE NEW PATENT FLAX BELTING.

The Only Good Belt made of Textile Fabric.—Manufactured solely from the best Russian Flax.

SPECIALITY FOR DYNAMOS, SAW MILLS, AND MAIN DRIVING PURPOSES.

Price List and Particulars from—

B. A. BARCZINSKY, 21, Albany-street, LONDON, N.W.

SILVER MEDAL (HIGHEST AWARD) MELBOURNE, 1881.

JOHN SPENCER,

Globe Tube Works, WEDNESBURY,

AND 3, QUEEN STREET PLACE, CANNON STREET, LONDON, E.C.

TUBES

FIRST PRIZE, SYDNEY, 1880.
TUBES AND FITTINGS for Gas, Steam, and Water; Galvanised, Enamelled, and Hydraulic Tubes; Boiler
Tubes and Fittings; Gas Fitters' Tools; Brass Cocks, &c.
ANTI-CORROSION TUBES AND FITTINGS COATED BY BARFF'S RUSTLESS PROCESSES.

SALES OF COPPER ORES.

COPPER ORES SOLD AT THE CORNWALL TICKETINGS, FOR THE QUARTER ENDED DECEMBER 31, 1883.

Mines.	Tons.	Amount.
Devon Great Consols	2559	£4572 15 6
Mellandale	1637	4499 2 0
Wheal Orebor	892	3144 2 0
Gunnislake (Olliters)	528	3125 18 0
South Caradon	599	2250 4 6
Levant	450	2314 6 6
West Tolgus	267	1554 16 6
Bedford United	393	1404 3 6
South Devon United	520	1004 15 0
Marke Valley	335	937 6 0
Glasgow Caradon	235	843 3 6
Holmbush	380	745 15 8
Devon Friendship	68	404 1 6
Wheal Coates	70	372 13 0
Tincroft	82	307 10 0
Salstock and Dancoscombe	110	257 7 6
South Tolcarne	42	284 12 0
Emily	60	253 19 0
Prince of Wales	67	231 3 0
West Wheal Seton	56	231 0 6
East Wheal Uny	60	230 2 0
East Caradon	58	212 16 0
New Cook's Kitchen	45	193 19 0
Camborne Vean	40	179 7 6
Carn Brea	36	111 12 0
Botallack	10	110 0 0
Okel Tor	65	81 0 0
Carn Camborne	20	77 0 0
Mid-Devon	15	55 17 6
Wheal Jewell	24	48 12 0
Gawton	60	40 10 0
A. W. Clarke and Co.	17	0 12 6

COMPANIES BY WHOM THE ORES WERE PURCHASED.

Mines.	Tons.	Amount.
Vivian and Sons	2,338	£ 7,768 19 9
P. Grenfell and Sons	1,987	6,470 13 9
Nevill, Druce, and Co.	2,025	3,859 8 6
Williams, Foster, and Co.	1,940	7,185 9 3
Mason and Elkington	784	2,521 7 9
Charles Lambert	308	3,174 7 0
Total	9,583	£31,611 4 0

COPPER ORES SOLD AT THE SWANSEA TICKETINGS, FOR THE QUARTER ENDING DECEMBER 31, 1883.

Mines.	Tons.	Amount.
Brada	72	£ 218 1 0
Australian	32	323 2 0
Caveira	807	1,958 9 6
Garoune	236	1,360 8 0
Total	1093	£3,318 17 0
RECAPITULATION.		
British	72	£ 218 1 0
Colonial	32	323 2 0
Foreign	1093	3,318 17 0
Sundries	46	237 11 0
Total	1243	£4,097 11 0

COMPANIES BY WHOM THE ORES WERE PURCHASED.

Mines.	Tons.	Amount.
P. Grenfell and Sons	236	£ 604 4 0
Nevill, Druce, and Co.	305	1,175 5 6
Vivian and Sons	178	840 4 0
Williams, Foster, and Co.	318	774 3 0
Landore Copper Company	24	763 14 6
Total	1243	£4,097 11 0

THE COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coal into the port and district of London, by sea, railway, and canal, during the year 1883:—

By Sea.	Ships.	Tons.	By Railway and Canal.	Tons cwt.
Newcastle	2139	2,115,150	London & North-Western	1,638,771 14
Sunderland	1320	1,075,297	Great Northern	1,130,883 0
Seaham	266	176,370	Great Western	1,081,096 1
Hartlepool	523	249,667	Midland	2,350,318 0
Middlesbrough	31	1,974	Great Eastern	79,591 6
South	17	36,680	South-Western	67,618 3
Welsh	332	309,799	London, Chert., & Dover	10 0
Yorkshire	217	37,172	London, Til., & South.	—
Cumberland	1	193	South-Eastern	24,025 5
Duff	1	264	London, Brighton, &c.	—
Small coal	105	50,119	Grand Junction Canal	8,513 5
Cinders	31	5,105		
Colonial	33	8,435		
Culm	1	264		

Total	5087	4,074,469	Total	7,091,826 14
Imports—1882	5019	3,826,520	Imports—1882	6,554,255 13

Comparative Statement, 1882 and 1883.

By Sea.	Ships.	Tons.	By Railway and Canal.	Tons cwt.
Jan. 1 to Dec. 31, 1883	5087	4,074,469	Jan. 1 to Dec. 31, 1883	7,091,826 14
Jan. 1 to Dec. 31, 1882	5019	3,826,520	Jan. 1 to Dec. 31, 1882	6,554,255 13

Increase—1883..... 38 247,969 Increase—1883..... 537,571 1

EXPORTS.

Railway-borne coal passing "in transitu" through district	Tons	1,269,138
Sea-borne coal exported to British Possessions, or to foreign parts, or to the coast	881,781	
Ditto sent beyond limits by railway	231,550	
Ditto by canal and inland navigation	17,953	1,130,584
Railway-borne coal exported to British Possessions, or to foreign parts, or to the coast	446,440	
Ditto, by rail beyond district	699	
Ditto, by canal and inland navigation	1,251	448,390
Sea-borne coal brought into port, & exported in same ships	10,701	
Total quantity of coal conveyed beyond limits of coal duty district during the year 1883	2,858,813	
Ditto, during 1882	2,704,814	

Comparative Statement, 1882 and 1883.

Total distribution of coal from Jan. 1 to Dec. 31, 1883	2,858,813
Total distribution of coal from Jan. 1 to Dec. 31, 1882	2,704,814

Increase in the present year..... 153,999

General Statement, 1882 and 1883.

Increase in coals imported by railway and canal	537,571
Increase in coals imported by sea	247,969
Less increase in coal exported	153,999

Total increase in trade within the London district during present year 631,541

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coal into and from the port and district of London, by sea, railway, and canal during December, 1883:—

By Sea.	Ships.	Tons.	By Railway and Canal.	Tons cwt.
Newcastle	247	247,606	London & N.-Western	143,779 1
Sunderland	131	112,920	Great Northern	101,674 0
Seaham	38	18,585	Great Western	118,864 10
Hartlepool	47	22,209	Midland	219,298 0
Middlesbrough	2	302	Great Eastern	87,274 9
South	13	5,050	South-Western	5,864 5
Welsh	24	22,457	South-Eastern	1,648 12
Yorkshire	10	1,883	Grand Junction Canal	910 0
Small coal, cinders	11	5,566		
Colonial	1	70		

Total	514	436,658	Total	679,112 17
Imports—Dec. 1883	447	365,128	Imports—Dec. 1882	614,087 5

EXPORTS.

Railway-borne coal passing "in transitu" through district	Tons	123,743
Sea-borne coal exported to British Possessions, or to foreign parts, or to the coast	85,710	
Ditto sent beyond limits by railway	18,445	
Ditto by canal and inland navigation	3,093	106,248
Railway-borne coal exported to British Possessions, or to foreign parts, or to the coast	57,320	
Ditto, by canal and inland navigation	112	57,432
Sea-borne coal brought into port and exported in same ships	738	
Total quantity of coal conveyed beyond limits of coal duty district during December, 1883	288,161	
Ditto, during December, 1882	283,686	

HOLLOWAY'S PILLS.—Bilelessness, flatulency, acidity, nausea, and all dyspeptic indications may be speedily relieved by these famous pills, of which large quantities are shipped to all parts of the world. The constantly increasing demand for Holloway's medicine proves its power over disease, and its estimation by the public. In weakness of the stomach, in diseases of the liver, and in disorders of the system caused by cold or a sluggish circulation, no medicine is so efficacious, no remedy so rapid, as these pills, which are altogether incapable of doing mischief. By quickening digestion, they give refreshing sleep, sharpen the appetite, impart tone to the digestive organs, purify and enrich the blood, regulate the secretions, and strengthen the whole physical frame.

FRANCIS & JENKINS,

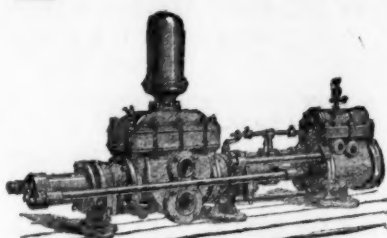
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Manufacturers of Steel-pointed Spades and Shovels, Draining and Grafting Tools, &c. Also Manufacturers of

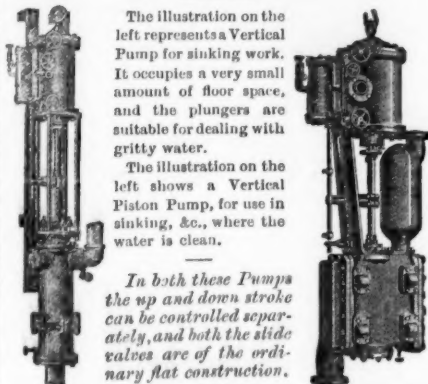
COPPER WORKS LADLES,

To which special attention is given. Rabble Heads, Paddles, and every description of Light Hammered Work.

PUMPS FOR MINING USE.



HORIZONTAL DOUBLE PLUNGER PUMP, Suitable for Gritty Water.



The illustration on the left represents a Vertical Pump for sinking work. It occupies a very small amount of floor space, and the plungers are suitable for dealing with gritty water.

The illustration on the left shows a Vertical Piston Pump, for use in sinking, &c., where the water is clean.

In both these Pumps the up and down stroke can be controlled separately, and both the slide valves are of the ordinary flat construction.

THE PULSOMETER ENGINEERING COMPANY, LIMITED.

NINE ELMS IRONWORKS,

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City Offices—61 and 63, Queen Victoria St., E.C.

PUMPS FOR ALL DUTIES.

Engines, Boilers, Cranes, and General Machinery.

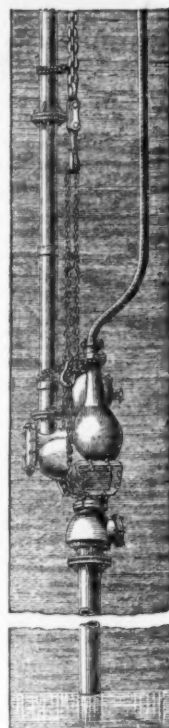
THE PULSOMETER

PATENT STEAM PUMP,

WILL PUMP ALMOST ANYTHING. NEEDS NO SKILLED ATTENTION. WILL WORK SUSPENDED ON A CHAIN. NO OILING, LEATHERS, OR PACKING.

THE DEANE DIRECT ACTING PUMP, for High Lifts and Heavy Pressures. Very simple and reliable. First-class material and workmanship. Made in a great variety of patterns and sizes to suit various requirements.

The illustration on the right represents a Pulsometer suspended in a shaft.



S. MASON & CO.,

Stone Machine Works, Leicester, England.

NEW PATENT CIRCULAR

Stone & Ore Breaker, Grinder & Pulverizer

The Simplest and Strongest Machine in the World.

The only Machine made that will Break, Grind, and Pulverize in one operation either wet or dry mineral to any degree of fineness, also by taking away the rollers it will break to any size (see illustration No. 2.) This is the only machine in the world that will reduce all that is put into it to the required size, other machines open and shut, so let larger sizes through than what is wanted, besides mixing them together. A Machine can be seen at the Works in motion, breaking up any required mineral.

READ THIS—

Lord Donnington's Works, Cloud Hill, Near Ashby-de-la-Zouch, Nov. 29, 1883. Gentlemen,—The Breaker, Grinder, and Pulverizer is working well, and giving satisfaction.

Yours truly, J. W. STABLEFORD, Manager.

No. 2.—View of Machine as a Breaker for different sizes.

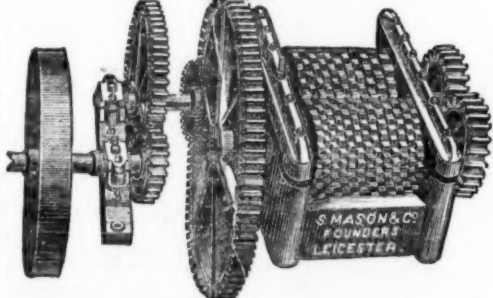
AND THIS—

To Messrs. S. Mason & Co., Dear Sirs,—The six Stone Breaking Machines you have supplied to us are doing their work well and giving every satisfaction. Our stone being so hard, we have broken several Machines that we had bought from other firms, but the Machines purchased from you are strong enough to meet our requirements.

Yours truly, S. D. POCHIN, Croft Quarries, near Hinckley.

AND THIS—

The Tees Searle Company, Acklam Furnaces, Middlesbrough, Nov. 29, 1883. Gentlemen,—The 12 x 7 Stone Breaker you supplied us with in August, 1882, is working first class. We should think it has the most severe test (continually) to which any Stone Breaker is subjected. We are pleased to inform you that our customers, who are chiefly Surveyors, speak highly of it.—Yours truly, T. W. FENT, Secretary. Messrs. S. Mason & Co.



S. M. & Co.'s Roller Mill for Stone, Ore, Bones, &c. The teeth are made harder than steel, and slide on a cylinder, so are easy renewed when required, and are made to suit any material.

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No. 1 size, 7 in. single cylinder, with 2 ft. drums.	
No. 2 size, 9 in. single cylinder, 2 ft. 6 in. drums.	
A,—6 in. double cylinder, with 2 ft. 3 in. drums.	
B,—8 in. " " 3 ft. 0 in. drums.	
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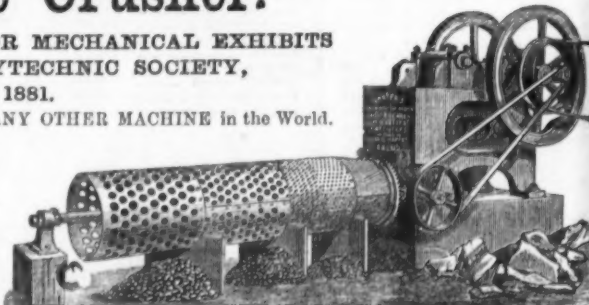
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Yours truly, E. ORGAN.

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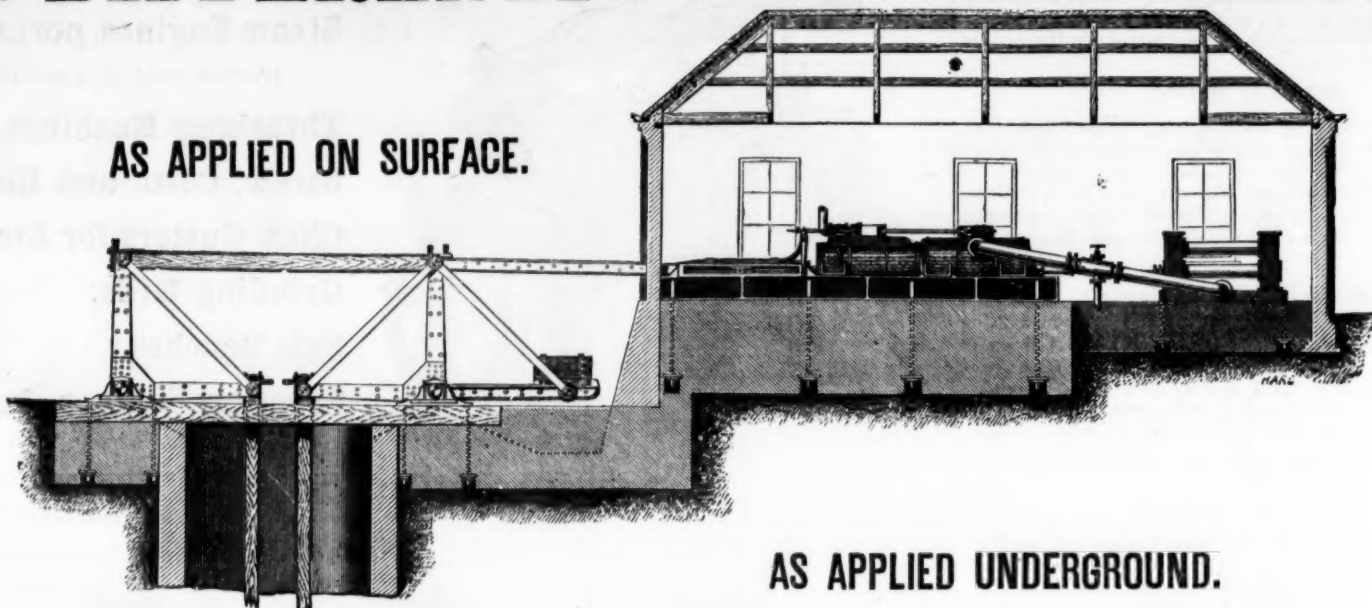
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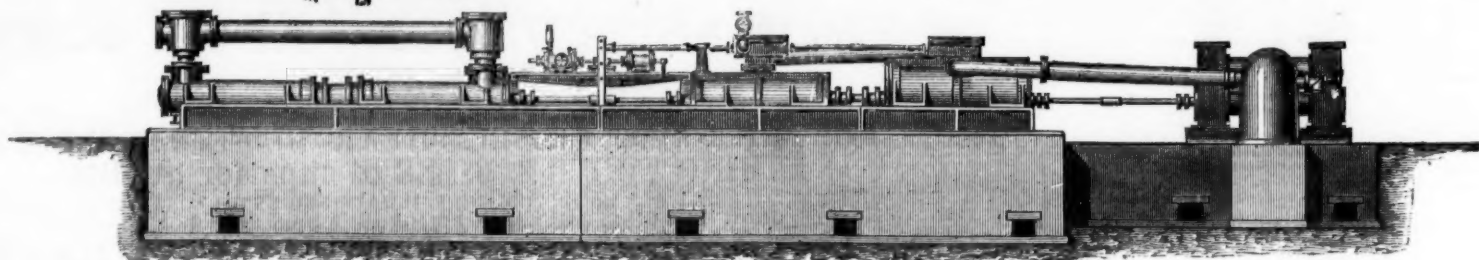
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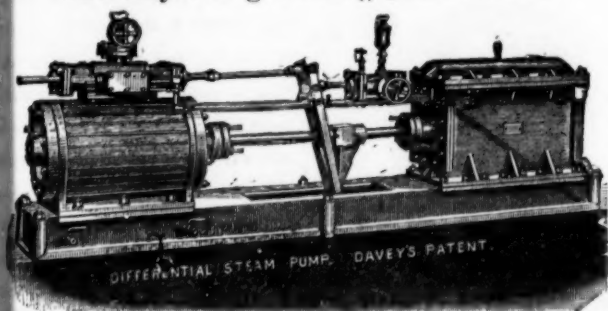
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10	7	15	10,400	130	70	80	100	6	1 1/2	2 1/2
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12	6	24	6,500	250	90	104	130	5 1/2	2	2 1/2
12	7	24	10,500	180	96	110	136	6	2	2 1/2
12	8	24	13,500	140	100	114	142	7	2	2 1/2
12	10	24	21,300	90	120	136	175	5 1/2	2	2 1/2
14	7	24	10,400	250	110	130	156	6 1/2	2 1/2	3
14	8	24	13,500	190	120	145	165	6	2 1/2	3
14	9	24	17,300	150	130	150	172	7 1/2	2 1/2	3
14	10	24	21,300	120	140	162	190	7 1/2	2 1/2	3
14	12	24	30,800	80	160	190	216	9	2 1/2	3
16	8	24	13,700	250	140	170	195	6	3	3 1/2
16	9	24	17,300	200	150	180	215	6 1/2	3	3 1/2
16	10	24	21,300	160	160	196	225	7 1/2	3	3 1/2
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Messrs. Yeadon and Co.
I have the honour to inform you that the Briquette Machines work very well. The Briquettes are very well made. I am highly satisfied with your workmen, who have done their work very well.
The undersigned, Civil Engineer of Mines, Chevalier of the Legion of Honor, Consulting Engineer to the Mines de Vendin-lezto, Bethune, Pas-de-Calais, certifies that the Briquette Machinery for making Briquettes of Coal, supplied by Messrs. Yeadon and Co. to the above Company is working to their entire satisfaction.
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SYLVA CATTIER, General Manager.

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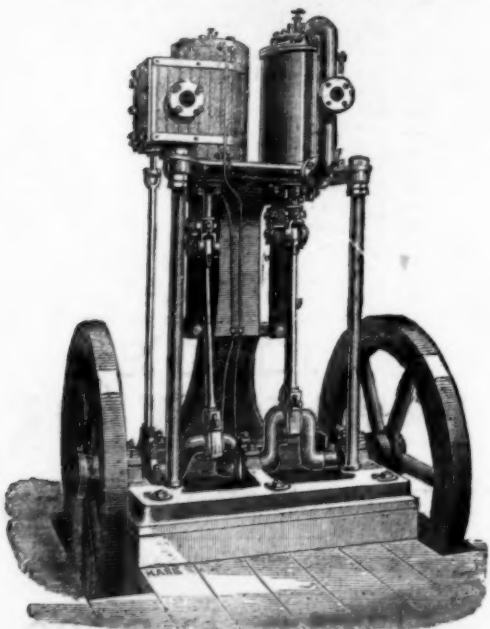
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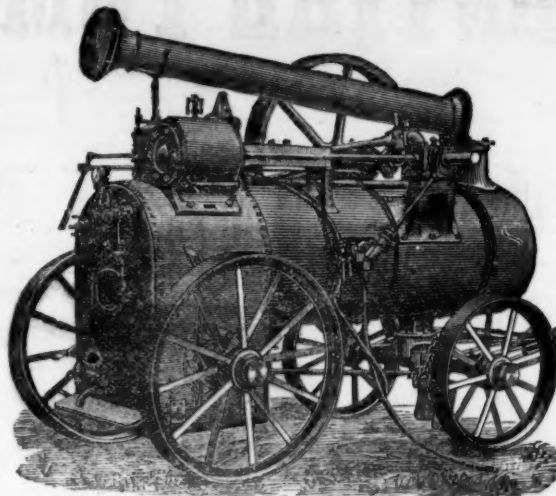
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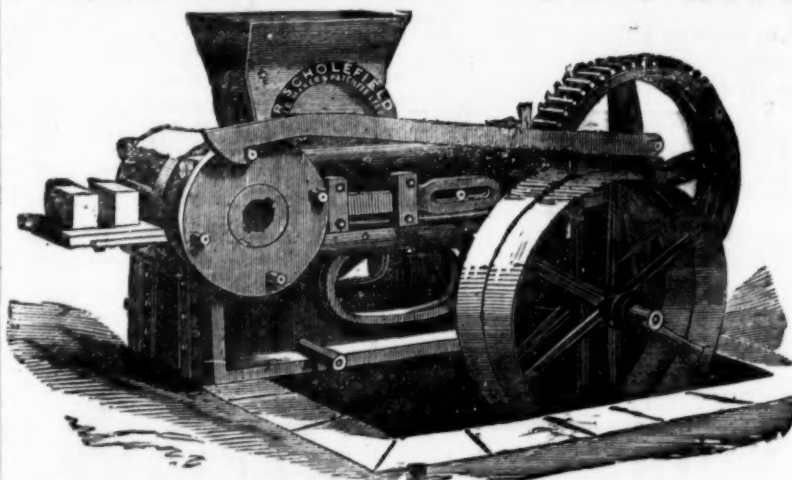
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3 men digging, each 4s. per day	12
1 man grinding, 4s. 6d. per day	6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	2
1 boy greasing, 1s. 6d. per day	1
1 engine-man, 5s. per day	5
1 man wheeling bricks from machine to kiln, 4s. per day	4

Total cost of making 10,000 pressed bricks £1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.

As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS KIRKSTAL ROAD, LEEDS.

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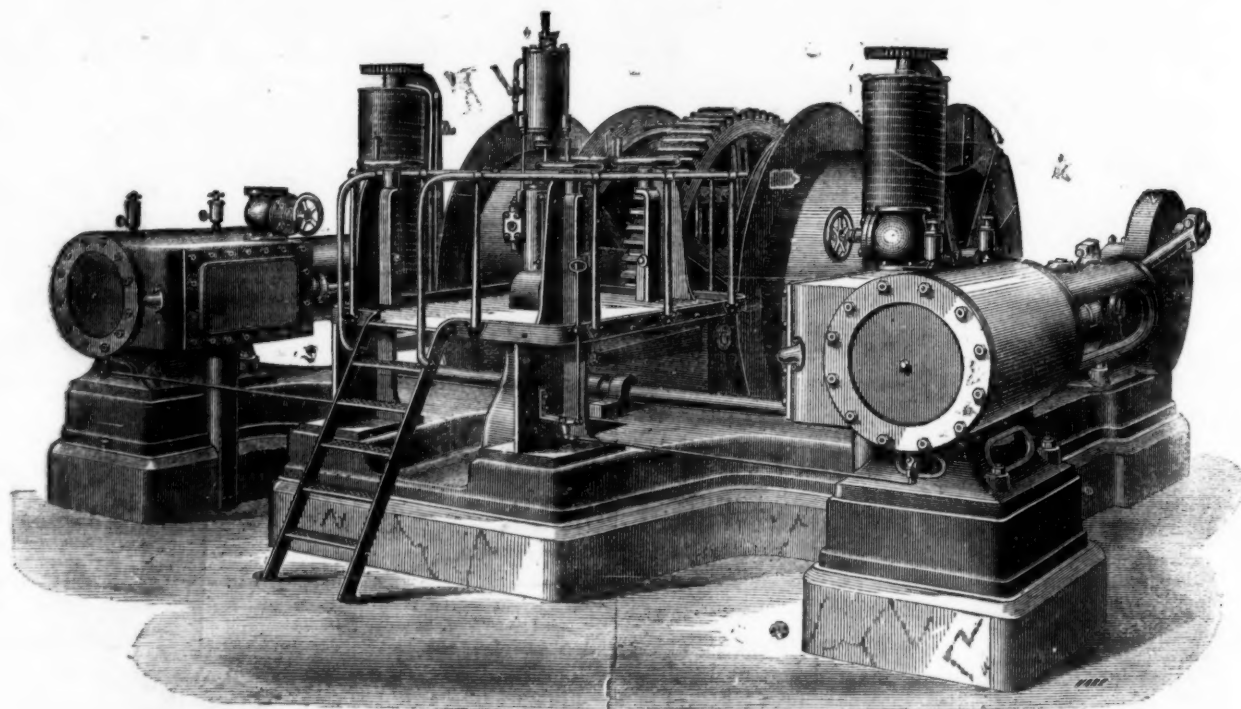
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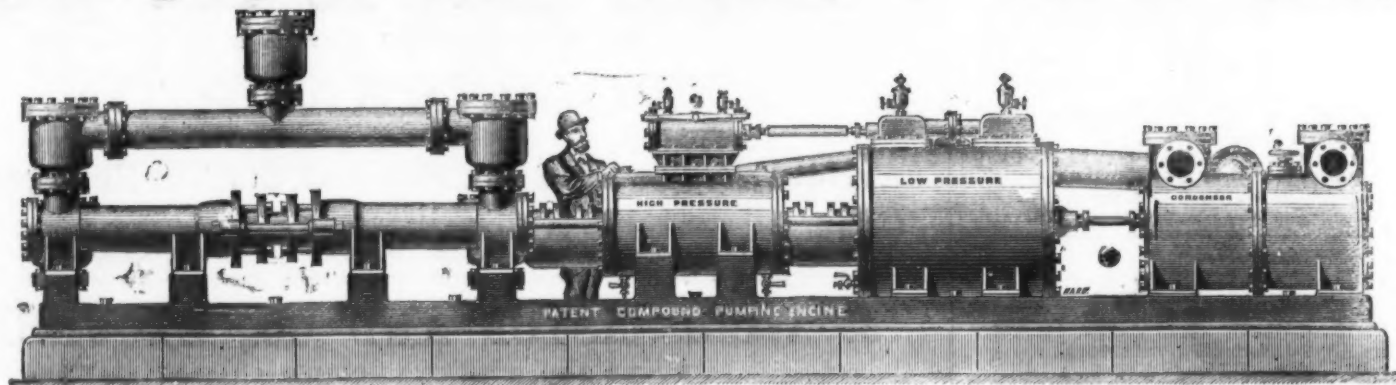
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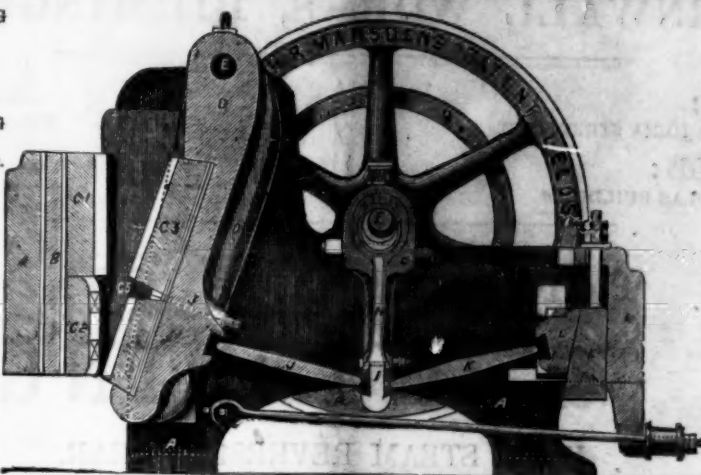
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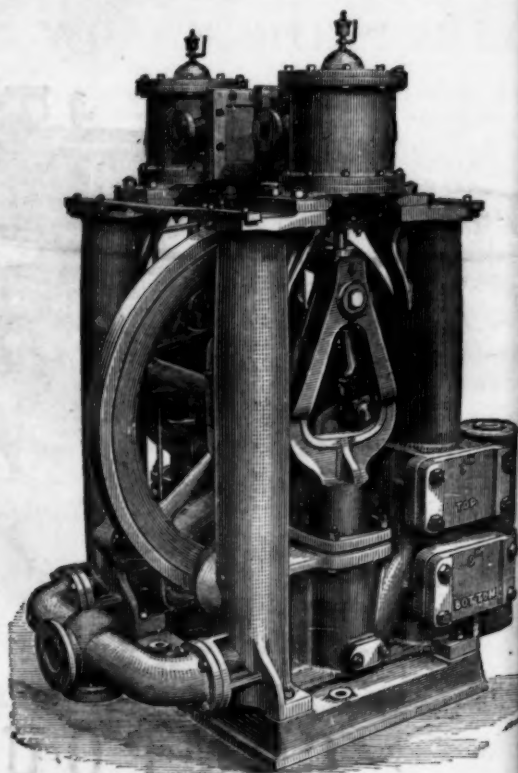
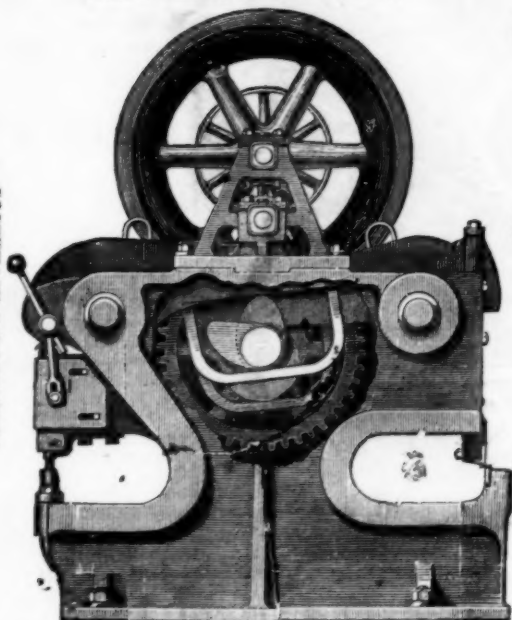
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